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THE  
**LECTURES**  
OF  
SIR ASTLEY COOPER, BART. F.R.S.  
SURGEON TO THE KING, &c. &c.  
ON THE  
PRINCIPLES AND PRACTICE  
OF  
**SURGERY,**  
WITH  
ADDITIONAL NOTES AND CASES.

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By FREDERICK TYRRELL, Esq.  
SURGEON TO ST. THOMAS'S HOSPITAL, AND TO THE LONDON  
OPHTHALMIC INFIRMARY.

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VOL. I.

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1826.



## PREFACE.

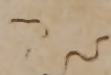
THE principles contained in the following Lectures, have almost entirely originated from Sir Astley Cooper, and have been taught by him for more than thirty years.

Their excellence and accuracy have been proved, not only by the extensive and successful practice of Sir Astley himself, but by the experience of several thousands of medical men who have received them from him, and by whom they have been propagated through all parts of the world in which surgery is practised as a science.

Having, by the greatest industry and perseverance, gained a character and celebrity, which few in any profession have acquired, and none more deservedly obtained, Sir Astley is now about to resign his situation as Surgical Lecturer, which he has held with so much honour to himself, and advantage to those who have received instruction from him.

Confident, therefore, that a correct and authentic copy of his Lectures will be acceptable to the profession, and having, as his apprentice, and subsequently, had the best opportunities of becoming acquainted with his professional opinions, I have undertaken the publication of them.

Before sending this first part to press, I took the liberty of requesting Sir Astley to peruse it, which he





has had the kindness to do, and returned it with the following note:

“ DEAR SIR,

“ I have looked over the manuscript of my Lectures on Surgery.

“ It contains a faithful account of the principles of Surgery, which, for forty years, I have been endeavouring to learn, and of the practice which, for thirty-two years, I have been in the habit of teaching, in that school which is proud to rank amongst its Lecturers in Surgery the names of Cheselden, Sharp, Warner, Else, and last, although not least, of my most able and judicious preceptor and predecessor, Mr. Cline.

I am,

Yours very truly,

ASTLEY COOPER.”

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# LECTURES,

&c.

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## LECTURE I.

GENTLEMEN,

THE subject of this evening's lecture is, Irritation; which, being the foundation of surgical science, you must carefully study and clearly understand, before you can expect to know the principles of your profession, or be qualified to practise it creditably to yourselves, or with advantage to those who may place themselves under your care.

The doctrine of irritation teaches the immediate and remote effects of injuries; in what manner nature restores them on the one hand; and, on the other, the mode in which apparently trifling accidents prove ultimately destructive.

It is easy to conceive how the division of a large artery occasions death by hæmorrhage; but to explain the means by which an apparently slight injury, as a scald or a burn, produces the same destructive effect, requires an intimate acquaintance with the subject of irritation.

*The actions of the body supported by natural stimuli, directly, remotely, or by sympathy.*—All the actions of the body are excited and sustained by internal and external impressions, which are called stimulants; as the blood is the stimulus to the blood-vessels, the bile to the intestines, and heat, in a certain degree, to the whole system; and there exist between all parts intimate relations, corresponding with each other, and carrying on a reciprocal intercourse of action. The beautiful harmony produced by a perfect concurrence of all the actions, is called health. Thus, impressions not only produce effects on the part to which they are directly applied; but, in consequence of the freedom of nervous communication, remote parts of the body are becoming affected by them, and many of its natural functions are supported by sympathetic communication. The real nature of sympathy is yet unknown, but we are acquainted with many of its effects; and, as an example, we may give the communication which exists between the uterus and breasts;

as the former is impregnated, and the various changes proceed in it during the period of gestation; so corresponding alterations are proceeding in the breasts, the glands enlarge gradually, the nipple becomes elongated, and the secretion of milk commences; thus, before the child is born, nature has carefully provided for its future support. Many other of the natural functions of the body are supported upon the same principle; as sneezing, which is a sympathetic action between the nose, velum palati, and the abdominal muscles, instituted to remove causes of irritation from the nose: coughing, which is a sympathy between the larynx and abdominal muscles: breathing and the expulsion of the fæces are also sympathetic functions, and with these a multitude of other examples might be given.

*Diseased sympathy.*—But sympathetic effects also follow injuries and diseases, and become the causes of restoration on the one hand, or of destruction on the other; and this state of the body is called irritation.

*Definition of irritation.*—Irritation may be defined to be, an altered action excited in the body by an unnatural impression.

*Irritation of sensation.*—Irritation sometimes produces only diseased sensation; thus a sympathetic pain is experienced in the knee and foot from diseased hip; when a person has a stone in his urinary bladder, acute pain is felt at the extremity of the penis; the passage of an urinary calculus through the ureter occasions retraction of the testicles and pain in the thigh; a diseased prostate gland produces pain in the inner part of the thighs; disease of the uterus occasions pain in the loins, and around the hips, and sometimes weakness of the inferior extremities, amounting nearly to a state of paralysis; pain and heat in the throat arise from a morbid state of the pylorus; itching in the nose from worms in the intestinal canal; pain between the shoulders from affection of the liver; and pain in the loins from inflammation of the testicles.

*Diseased action produced by irritation.*—But by irritation, not only diseased sensations but morbid actions are excited in other parts, which are near and intimately connected, or in distant parts; thus inflammation is produced in the testicle from irritation in the urethra. Swellings in the breast are frequent consequences of morbid change of the functions of the uterus; the diaphragm is frequently thrown into convulsive action, from grangrene of the most remote parts; producing hiccough: retention of urine I have known more than once occur after the operation for popliteal aneurism. But there is no organ more frequently affected by irritation than the stomach. For instance, a blow is received on the head, occasioning injury to the brain; vomiting is one of the first and most constant symptoms, and by this we are led to detect such injuries. Vomiting is produced when the testicles are injured; when the intestines are burst, wounded, or strangulated, and from a gall-stone passing the biliary duct: injury to the iris frequently occasions vomiting; and an obtuse pain in almost any part of the body will occasion sickness.

*Course of irritation.*—Irritation is generally communicated through the medium of the nerves, of which there are two systems in the body; the first, composed of the brain, spinal marrow, and their nerves, which naturally convey sensation and volition; the second consisting of the grand sympathetic nerve, the centre of which is behind the stomach, in the semilunar ganglion and solar plexus. The modes of sympathetic communication are various. In some instances, the course of irritation is from the irritated part to the sentient extremity of the nerve, as the pain experienced in the knee and foot from a disease of the hip; or the pain in the little finger and half of the ring finger, when the ulnar nerve is struck at the elbow: injuries of the brain produce vomiting, their influence being imparted to the stomach through the medium of the eighth pair of nerves. In other cases, the course of sympathy is from the affected part to the origin of the nerve; thus pains in the loins is consequent on diseased testicle; or pain between the shoulders from affection of the liver. Occasionally the sympathetic communication is through the brain, as the following case will prove. Mr. Toulmin, of Hackney, attended a lady on account of her suffering severely from a diseased tooth, and she appeared also to be afflicted with hemiplegia. Mr. Toulmin extracted the tooth by the lady's desire, and in a short time the paralytic affection entirely subsided.

Irritation on the nerves of the grand sympathetic is communicated to the stomach probably through the medium of the semilunar ganglion, and vomiting is directly produced, also in strangulated hernia, or when biliary or urinary calculi are passing the respective ducts, or when a severe blow is received upon the testicle. The other system of nerves, viz. of the brain, spinal marrow, &c. are less affected in these cases; and, even when injuries prove fatal, the absence of cerebral sympathy is remarkable, as the patients are generally quite collected, until nearly the last moment of their existence.

*Irritation is local or general.*

*Local.*—Sometimes it is local only; thus, a decayed tooth will produce an abscess, and the matter escape by forming an opening through the cheek: this ulcer will be very difficult to heal, if the tooth remain; but extract it and the disease will quickly disappear, the cause of irritation being removed.

Many cases of this kind have fallen under my observation, and I will relate a few of them by way of illustration.

*Case.*—Some years since, two persons came to consult me from the same town (not knowing each other's situation or intention;) each of them had an abscess near alveolar processes; which, on examination, I found extensive, and it had produced an opening through the cheek. The disease had been of long standing in both cases, and occasional pain was experienced in the surrounding parts of the jaw; I directed a diseased tooth, near the ulcer, to be drawn; which being done, the patients quickly recovered.



*Case.*—A lady was for a long period afflicted with a fungoid granulation, which protruded through an ulcerated opening in the cheek: she tried for several months every remedy that was recommended to destroy the fungus, but without producing the desired effect; a tooth, nearly opposite the opening, being occasionally painful, she was advised to have it extracted; this was done, and there was no longer a difficulty in curing the fungoid growth; for it was absorbed rapidly, the most simple applications only being used.

*Case.*—A gentleman, of my acquaintance, was much annoyed by an ulcer on his chin, every attempt to heal which had proved abortive; at length one of the neighbouring teeth became painful, and was in consequence extracted; when, to the great delight and astonishment of the gentleman, the ulcer on his chin healed rapidly. These cases are mentioned to show the necessity of seeking, with all possible care and attention, for the causes of irritation; as the removal of them is often alone sufficient to effect a cure, and always to afford relief, which would not otherwise arise. Most of you have probably experienced the suffering produced by the irritation of an extraneous body lodging under the eyelid, and the instantaneous relief afforded by its removal.\*

*General.*—Of the *general effects* which are produced by irritation, we may mention the following: a person has a bougie passed into his urethra for the first time, the urethra is irritated by it; he says, I feel faint; becomes sick, looks pale, and, without care, he drops at your feet; his pulse has nearly ceased, and his body is covered with a cold perspiration: you place him on a sofa, with his head a little lower than his body, and, as soon as the blood freely enters the brain, all his functions are restored: thus by irritating the urethra the stomach is influenced, the actions of the heart are suspended, and the powers of the mind vanish. In irritation of the urethra, on the evening of the same day to the introduction of the bougie, rigours, succeeded by heat, and profuse perspiration, are common consequences. Fever is excited in dentition, and a paralytic state of some part of the body is not an unusual consequence: a child frequently loses the use of one arm, or one leg, or sometimes of both legs, from the determination of blood to the head in this fever.

Slight injury to the stomach, although it does not occasion any

\* A man, who was employed at a manufactory for fire-arms in the country, was struck by a small scale of metal in the eye; it penetrated the anterior part of the cornea, and became fixed between its laminae; it produced considerable irritation and inflammation: numerous attempts were made to extract it, but without success, and the irritation and inflammation increased in spite of the very active means used to subdue them. After a few days he was sent to town, with a note, requesting I would give him my assistance; with some little difficulty I succeeded in removing the foreign body from the cornea, when the irritation and inflammation quickly subsided, and in a few days he again returned to the country with only a small speck on the cornea, in the situation of the wound.—T.

sensible organic change, will sometimes destroy life. A man recovering from fever and walking in Fleet Street, quarrelled with a woman; another female came up, and gave him a blow in the region of the stomach, which caused almost instantaneous death. Upon dissection, to discover the cause of his expiring so suddenly, no morbid change was perceptible.

*Case.*—A healthy labourer, belonging to the India House, was attempting to lift a heavy weight, when another labourer came up, and said, “Stand on one side, let an abler man try;” at the same time he gave the former a slight blow on the region of the stomach, when the poor fellow immediately dropped down and expired. On examination of his body there was not any mark of violence discovered.\*

*Usual symptoms of general irritation.*—The symptoms of constitutional irritation which follow accidents will be best exemplified in compound fracture. A person receives an injury to one of his legs, occasioning a compound fracture of one or both bones: constitutional irritation soon commences; he first complains of pain in his loins, as if from an uneasy position; this extends to the back, in the course of the spinal marrow to the brain, occasioning pain in the head; he then becomes restless, and his countenance expresses anxiety; the tongue, at first, is covered with a whitish fur; but as the irritation increases it becomes yellow, and subsequently, in the aggravated stage, it has a dark brown coating; loss of appetite, nausea, and vomiting, evince derangement of the stomach; the secretion of the liver is so far diminished, that bile is produced in very small quantity, so that the motions are white, and sometimes a fluid is produced, which differs much from bile in its appearance.† The secretion of the intestines is diminished and unhealthy; the bowels are constipated, the kidneys secrete but little urine, and it is of a deep colour; the skin has its secretion stopped, and it is hot and dry. As these symptoms arise, the pulse quickens, becomes hard, irregular, and ultimately intermittent: corresponding alterations take place in the respiration; it being, at first, somewhat quicker and finally much hurried and laborious. The functions of the brain, spinal marrow, and nerves, become further changed; subsultus tendinum is produced; slight impressions on the senses become almost intolerable; the mind is at first hurried, and then the patient sinks into a low, muttering delirium. The grand sympathetic nerve becomes further affected; the abdomen swells from accumulated flatus in the intestines; vomiting and

\* Query—Does the blow affect the semilunar ganglion?

† A child received a blow on the head, which occasioned inflammation of the pia mater, of which it died. On examination after death, a colourless fluid was found in the gall-bladder, some of which is preserved in a glass tube, in the museum of Gdý's Hospital.

When great constitutional irritation exists in children, their motions, when exposed to the air, become green, and this is more particularly the case when the brain is chiefly affected.

purging often both occur; hiccough is produced, and the patient, absolutely worn out by irritation, expires. Thus in constitutional irritation, whether from injury, or from external or internal disease, every part of the system may be affected, and it appears to take place in the following way: when a part of the body receives an injury, the nerves convey a knowledge of it to the important organs, as the spinal marrow, brain, heart, stomach, &c.: nature immediately commences the restorative process, by stopping all the customary secretions; the various outlets being thus closed, the blood collects in quantities in the heart and large blood-vessels, which propel it with unusual force to the injured part: giving rise to inflammation in whatever form can best accomplish the desired effect. This is an illustration of the manner in which nature contends for a cure; she occasionally requires to have her ardour checked, or aided, in proportion to her powers: we must watch with "eagle's eyes" her proceedings, and be exceedingly cautious in our interference; for by restoring the natural secretions too soon, we may, by thus abstracting blood from the injured part, prevent the restorative process; or, by adding to excitement, we may prevent the beautiful and judicious operations of nature, by producing too much action.

The degree of constitutional irritation resulting from injury depends on several causes.

*The importance of the part injured.*—1st. On the importance of the part injured. A blow on the abdomen from the kick of a horse, by which one of the intestines becomes burst, renders the pulse scarcely perceptible at the wrist, covers the body with a cold perspiration, and destroys life in from twelve to eighteen hours.

*The extent of injury.*—2dly. In parts less important, on the extent of injury, as compound, when compared with simple fractures.

*The nature of the injury.*—3dly. On the nature of injury, as in wounds: if a wound be a simple incision, it easily heals; but when contused, the parts must slough before the injury can be cured: punctured wounds, also, by the influence on the nervous system, frequently occasion tetanus.

*The difficulty of restoration.*—4thly. On the difficulty of restoring the injured part, as wounds of ligament, tendon, fasciæ, or cartilage; and parts possessing but little vital powers, as in wounds and diseases of joints.

*State of the constitution.*—5thly. On the state of constitution at the time the injury is received; this varies at the different periods of life, and is modified by the patient's habits, his mode of living, and the climate in which he resides. Excessive irritation frequently follows operations on very young subjects, but rarely those performed on very old persons. I have known children, after having undergone the operation of lithotomy at a very early period, die of convulsions. I should not, therefore, recommend the operation to be performed on a child under the age of two years. I have, how-



ever, operated successfully for lithotomy, at the age of one year and nine months, but am disposed to recommend its postponement when possible. In infancy the irritability is excessive, and the system is easily excited to destruction: after the period of two years, the irritability is considerable, but the powers of restoration are great. In middle age, the irritability is less, and the restorative power still considerable: in age the irritability is much diminished, but the powers of restoration are less also. Persons who are deprived of their natural rest, and take little food, suffer more from injuries than those who sleep their due proportion; and the temperate man often suffers but little from an injury, which will produce most distressing constitutional symptoms in an intemperate person.\* The following cases are impressive, showing the dreadful constitutional sufferings which oc-

\* In persons addicted to the constant use of stimuli in large quantities, the natural powers of the constitution are so weakened, that they are not sufficient for the restoration of a severe injury, when the patient is altogether deprived of the stimuli; it is, therefore, necessary, in many of these cases, to allow them to be taken in moderation, to produce the proper action for repairing the injured part. This is well illustrated by the following cases, which also show the necessity and importance of a minute inquiry into the history of patients, previous to their coming under your care.

John Westrip, *at. 30*, was admitted into St. Thomas's Hospital on account of a severe injury to the elbow joint, caused by the wheels of a loaded coal waggon passing over the part. The nature and extent of injury were such, that I thought it advisable to amputate the limb. This was done about twenty hours after his admission into the hospital, as he would not submit to have it performed sooner. He was much intoxicated when the accident happened, but I could not get any information as to his previous history from the persons who came with him, for they had not been before acquainted with him. On the second day after the operation he had severe constitutional suffering; his pulse was very quick, his skin hot, his countenance anxious; the stump was much inflamed, and very painful: these symptoms rapidly increased, he became delirious, and the edges of the wound began to slough; the usual remedies were given to subdue the irritation, but without producing relief. On the evening of the day after he became delirious, I learnt from one of his friends who came to see him, that he had been in the habit of taking ten or twelve pints of porter daily, besides spirits. I immediately sent for some porter, which he drank with great eagerness; and in the course of an hour after, he fell a-sleep. He slept several hours, and awoke perfectly composed and sane: the porter was continued daily, with a few ounces of wine; the sloughing of the stump stopped, and he rapidly recovered.

Charles Gordon, *at. 40*, applied at the surgery of St. Thomas's Hospital for advice, on account of severe inflammation of the arm, which had arisen from a slight contused wound on the elbow. On examining the arm I found that inflammation of a phlegmonous character, attacking the cellular tissue, extended from the carpus to the shoulder; this had produced excessive constitutional suffering; his tongue was very foul, his bowels affected with diarrhœa, his pulse very rapid, his countenance anxious, and his skin hot and dry. I had him immediately admitted into the hospital, and ordered medicines to allay the constitutional irritation, and to check the diarrhœa; nevertheless, in the evening he became delirious. On the following morning I learnt that he had been accustomed to take considerable quantities of spirits daily; in consequence of which I directed he should have some gin (his favourite liquor.) Soon after taking the first quantity he became much more tranquil; it was, therefore, repeated, and produced as good effects as the porter in the former case.—T.

casionally result from slight local injury. Dr. Ludlow, of Calne, pricked his hand with a thorn in shooting, and died of tetanus in a few days. I was called to see a young gentleman who had been thrown into a hedge, by which his hand was lacerated; in seven days he had symptoms of tetanus, and on the ninth day he died.

*Case.*—A man, who lived intemperately, was bled on Tuesday, by the late Mr. Saunders; on the Wednesday he invited some friends to partake of a haunch of venison, of which he ate largely, and on the same evening drank a considerable quantity of wine; on the Thursday the party met again to finish the haunch; the patient indulged as freely on this day as on the former; this excess produced inflammation of the wound in the arm, which extended rapidly, and on the Saturday all the upper arm was in an highly inflamed state; gangrene commenced on the Sunday; on Monday I was asked to visit him; he was delirious, had hiccough, subsultus tendinum, and died on the Tuesday morning. When examined after death, a large portion of the integuments of the arm was found in a mortified state, with extensive suppuration in the cellular membrane; but the vein which had been opened was uninfamed.

*Case.*—Another remarkable case occurred in a brewer's servant, who, in removing some casks on a Saturday, had a small splinter of wood forced under the thumb nail; at the moment he did not regard it, but the same night awoke in considerable pain, and requested his wife to rise and to make a poultice: this he applied, but it did not afford any relief: on Sunday he became worse; Tuesday his hand was much swollen, and the pain had extended up the arm; on Thursday I was requested to see him, and on examination found that matter was formed in the hand; I made an opening with a lancet near the part where the splinter had entered, when a large quantity of pus was discharged; the patient appeared much relieved; but upon hearing a noise as I was about to quit the room, I looked round: by a convulsive effort the man had raised himself in bed, but immediately fell back and expired.

*Case.*—An instance opposite to those just mentioned, is furnished in the case of another brewer's servant, showing how great an injury may be sustained without producing any violent constitutional irritation. The wheels of a dray passed over this man's arm, producing a compound fracture of the bones composing the elbow joint; the integuments were much lacerated, and an extensive wound communicated with the joint. The patient, who was admitted into Guy's Hospital, would not submit to have the arm amputated, although strongly urged to do so. The injured parts were, therefore, dressed by the surgeon, who was surprised at the man's speedy recovery, without any unfavourable symptoms: thus an injury, which in one person would be attended with the most dangerous effects, will in another produce little constitutional derangement; and the same person may at one period suffer but little from a wound, which at another time may give rise to fatal consequences: thus many of the gentlemen who come from the country,

for the purpose of following their professional studies at the London hospitals, on their arrival in the autumn have but little constitutional irritability, and would suffer but in a trifling degree from severe injury; but in the spring, after having spent a considerable portion of their time in the dissecting room, and in the wards of the hospital, constitutional irritation is easily excited, and an injury which in the autumn would not have produced any inconvenience, creates excessive constitutional suffering, and is perhaps attended with fatal effects. It is on this account that punctured wounds inflicted in the dissecting room, often produce such distressing effects; though it may, in some instances, arise from the absorption of morbid matter, which usually produces the most aggravated form of constitutional irritation. Gentlemen cannot, therefore, be too careful in the use of the dissecting instruments; as carelessness in this respect has, in some cases, occasioned the loss of several valuable lives, and in others tedious suffering, and irremediable defects in the limbs.

That the distressing and often fatal effects arising in many of these cases, depends more frequently on the state of constitution, than on the absorption of a morbid poison, is evident from their rare occurrence in the early part of the season, although perhaps more wounds are inflicted on account of the gentlemen not being so expert in the use of their instruments, from want of practice: it also frequently happens, that of several gentlemen occupied in dissecting the same subject, two or more may receive wounds, but only one suffer from constitutional irritation; or they may be affected in different degrees, as the following case will prove. A man having died in Guy's Hospital, from the effects of severe injury to the pelvis, by which one of the ilia had been fractured, was removed after his death, by his friends, to Hackney. Permission being obtained to examine the body, my two apprentices, Mr. Callaway and Mr. Tyrrell, with a Mr. Scott, then a dresser at Guy's Hospital, went to Hackney, at my desire, and inspected the body. During the examination, each of them received several wounds from the numerous spiculæ of fractured bone. A day or two after Mr. Callaway had matter form in the theca of one of his fingers, which produced considerable constitutional suffering and enlargement of the glands in the axilla; the abscess in the finger was opened, and with great care and attention to his general health, he recovered in a few weeks. Mr. Tyrrell did not experience any inconvenience from the injuries he received; but Mr. Scott, on the contrary, suffered from the most aggravated form of constitutional irritation: he had abscesses in the thecæ, of the tendons in the hand, and in the absorbent glands, at the elbow, and in the axilla; he was delirious for some days, and did not perfectly recover for many months, during which time he suffered extremely.\*

\* There is much difference of opinion in respect to the origin of constitutional irritation in these cases, whether it arises from the absorption of poison,



*Climate.*—That warm climates increase irritability, and diminish the vital powers, is shown by the proneness to tetanus in such climes, and by the danger of operating on persons visiting this country, the inflammation following them, often becoming erysipelatous; and the most simple sore frequently becoming irritable, and disposed to gangrene. Mr. Elcock, a West Indian, pricked his finger in sewing up the body of a man recently dead: this was at twelve o'clock on a Monday; at night he spoke to me, when at Lecture, of a pain in his finger and arm; and I advised him to mention it to Dr. Haighton, with whom he lived. On Tuesday he was in considerable pain, which extended up the arm, and he had high febrile symptoms. On Wednesday he was delirious, and died during Wednesday night, or early on Thursday morning.

*Causes of death.*—Injuries producing fatal consequences destroy life in three different modes. 1st. When slight, by keeping up a continued constitutional irritation, they gradually wear out the system. 2dly. When more severe, they destroy by occasioning excess of action. 3dly. The most severe, by shock to the nervous system, cause death, without reaction. Thus I have seen a person admitted into Guy's Hospital, who had a laden waggon pass over his knee: the bones were crushed, but there was no wound or hæmorrhage, yet the person died in a few hours after his admission. I have also seen a man, who fell into a vat of hot beer, by which both his lower extremities were scalded, but the body escaped any direct injury. This man's pulse was very small and feeble; his skin was cold; his teeth chattered; no reaction took place, and he died in eight hours, notwithstanding stimulants were freely given. I have known a limb amputated, for compound fracture, above the knee, and the patient die in four hours after, without any reaction, the body was covered with a cold perspiration, and the pulse was scarcely perceptible.

*Case.*—I amputated a man's leg above the knee, in consequence of a shot through the upper part of the tibia. During eight hours after the operation, the pulse was with difficulty perceptible; at ten hours it was 90, and very small; at 30 hours he was vomiting, and had no evacuation from the bowels, his belly was tense, the pulse was 114, and small: at fifty-four hours the pulse was 120; he was still vomiting; costiveness, and abdominal tension; no appetite, and his skin hot: at sixty-eight hours his pulse was feeble, and 140 in a minute; the tongue had a brown fur in the middle, and was white at its edge. He had still vomiting, costiveness, and delirium: at eighty-one hours he died. The stump was in part

or from a previously deranged state of the constitution. Those who advocate the former opinion recommend the early application of escharotics, with a view to destroy the action of any morbid matter introduced into the wound. As far as my own experience goes, I believe the latter opinion to be correct, and therefore strongly condemn the use of caustics; the employment of which (if this opinion be correct,) instead of preventing mischief, augments it, by increasing local affection.—T.

gangrenous, and in part had the appearance of an amputation, performed only a few minutes before.

*Continued irritation.*—Irritation in chronic diseases, or continued irritation, exhibits symptoms somewhat different. There is a chilliness succeeded by heat, sometimes once, at others twice, in twenty-four hours: the tongue has a white fur, or is unnaturally red and smooth, is if deprived of its cuticle; a loss of appetite, with occasional vomiting; an irregular state of the bowels, obstinate costiveness is succeeded by profuse diarrhoea; the urine is smaller in quantity than usual; the skin is sometimes hot, so as to be parched and dry; at others copious perspiration attends, especially during the night, so as to oblige the patient to change the linen in the morning; the pulse is quick, from 90 to 120 in a minute; the respiration is difficult and hurried, and often attended with a slight cough; the sleep is interrupted; the mind is irritable; and the patient is at length worn out, by an action which is exhausting, from its continued frequency, rather than its violence.

*Dissection after death from irritation.*—In dissecting those who die from irritation little is found to explain the cause of death. In children who die from scalds there is more blood than usual in the vessels of the pia mater, and a greater determination of blood to the spinal marrow. In children dying from the irritation of teething, there is an effusion of from two to five ounces of water in the brain. In an adult dying from irritation, we have several times seen patches of cartilage and bone upon the pia mater of the spinal marrow.

*Treatment.*—The treatment of irritation being much the same as that required in inflammation, I shall give now but a short description of it.

*Local.*—When constitutional irritation arises from a local cause, the remedies must be chiefly directed to the source of the irritation; if possible, at once to remove it, or to lessen its effects on the constitution; but, on the contrary, when local disease is either promoted or aggravated by a deranged state of constitution; then the remedies must be in great part constitutional; for as the general health is improved, so will the local affection disappear.

*Case.*—A short time since, a case of compound fracture was taken into Guy's Hospital: in which at first nothing untoward occurred; but, after a short time, the patient's constitution suffered so severely, that his life was despaired of: a probe was passed into the wound, and a loose portion of bone was discovered pressing against the tibialis anticus muscle; the wound was dilated with a scalpel, and the detached portion of bone was extracted; immediately the constitutional irritation began to subside, he rapidly regained his former vigour, and was shortly discharged cured. Another patient was admitted into St. Thomas's Hospital, for simple fracture at the upper part of the tibia, which was soon succeeded by violent irritation of the whole system, and formation of abscess at the seat of fracture. The limb was amputated in consequence, and, when examined afterwards, it was found that the tibia had

been broken into several small portions, which had been acting as extraneous bodies, and had caused all the local and general mischief: the patient quickly recovered from the operation. These cases are sufficient to show the necessity of seeking the cause of irritation, and the importance of its removal.

*Constitutional.*—Constitutional irritation must not be too suddenly subdued or entirely destroyed, as a certain degree of irritation evinces that nature is endeavouring to accomplish the restorative process; keep it therefore within bounds, carefully watch its progress, and, if necessary, check its violence, but do not entirely destroy it.

*Means.*—There are two means of reducing irritation.

*Restoring the secretions.*—First, by restoring the secretions of the different organs, and, by thus opening the outlets, lessen fever. A man who has his skin hot and dry, feeling excessively heated, if you can produce a free perspiration, will be immediately relieved and become cool. When the irritation is severe, you must not limit your medicine to act on any particular organ, but try to restore all the secretions; and this is best effected by administering mercurials to act on the liver, aperients on the intestines, diuretics on the kidneys, and antimonials on the skin.

*Lessening the irritability.*—The second mode of relieving irritation is by allaying the excitement of the nervous system; this can be effected by giving opium and antimony combined; or calomel, antimony, and opium, to act on the skin or liver as well as the nervous system: the latter is one of the best medicines for allaying irritation, and may be given to adults in doses of two grains of calomel, two of antimonial powder, and one grain of opium: to this you may add saline medicines, for they promote the secretions and lessen the irritability of the nervous system. *Liquor ammoniæ acetatis* with *tinctura opii*, and the common saline with opium, soothe the system into peace. The alkalies, as potash and soda, diminish the irritable actions of organs, as may be seen in irritable bladder. *Hyoscyamus* and *conium* are also excellent remedies, especially in those persons with whom opium disagrees.

*Bleeding.*—The abstraction of blood lessens the momentum of the circulation, and prevents the danger of congestion in any of the vital organs; but it must be taken away with the greatest care, not to diminish too much the powers of the constitution. A man was taken into Guy's Hospital, having a concussion on the brain; the dresser, who admitted him, was a great admirer of venesection, and consequently bled the patient frequently, and in large quantities; in ten days the man died. On examining the head after death, a very slight laceration of the brain was discovered, but no attempt at restoration: the continued abstraction of blood had deprived nature of her restorative powers. In compound fractures it is extremely dangerous to bleed largely; as, by lessening the power of the constitution too much, there is not sufficient energy to perform the task of reparation.

If an important disease exist, nature will not always have pow-



er to perform the necessary duty of restoration. A man was admitted into St. Thomas's Hospital, under Mr. Cline, for a simple fracture of the os humeri; the fracture did not unite, and scarcely any inflammation arose; on the twenty-ninth day the man died suddenly. Upon dissection an aneurism was found in his aorta, which had burst: very little if any change had taken place in the fractured part.

*Treatment of chronic irritation.*—When there is chronic irritation, you can only restore the system to healthy action by slowly acting on the secretions; to produce these diseases, some slow feverish action has existed, and some one of the secretions has been lessened; the skin is dry, or the bowels are costive; the bile is not properly secreted, or the urine is less abundant; hence the blood is locked in the system, and congestion, followed by inflammation, produces local diseases. The pil. hydrarg. submur comp. is the best remedy under these circumstances, as it increases the secretions of the liver, intestines, kidneys, and skin. The blue pill, or calomel, should be followed by an aperient in the morning, as they act on the liver, but not in proportion on the other secretions. To attempt to cure such diseases suddenly, or by violent and active means, must be ever improper; a chronic treatment is required, and by slow degrees only can you restore the body to a healthy state. Let me repeat, *all the secretions must be restored as this is the grand principle in the cure of disease.*

#### ON THE INFLUENCE OF THE MIND UPON THE BODY.

The influence of the mind on some of the functions of the body, in a state of health, is well known: grief producing an immediate secretion from the lachrymal gland, as is evinced by a flow of tears; and fear occasioning an abundant secretion of urine, compelling the person to discharge it frequently; on some occasions, the same feeling produces a copious secretion of bile followed by jaundice. In disease, the influence of mental impression requires great circumspection on the part of the medical attendant. A tranquil or a cheerful state of mind, under accident or disease, greatly contributes to the patient's recovery; and those who are accustomed to witness a patient in the first few hours after he has received a severe injury, augur, from his manner, the probability of recovery. If he submit himself to his fate without repining; if he yield himself to the advice of his friends, and readily consents to all that is proposed for his relief, he generally does well; but if, on the contrary, he bitterly laments his fate, or his mind is even too actively engaged in suggesting the means of relief, impatient in their not being immediately obtained, being officious in trying to assist, anticipating every desire, such a person has a degree of constitutional irritability highly unfavourable to his recovery. It is the surgeon's duty to tranquillize the temper, to beget cheerfulness, and to impart confidence of recovery. Some

medical practitioners are so cold and cheerless as to damp every hope; whilst others inspire confidence of recovery, and a disregard of situation, which supports the regular performance of all the actions necessary for restoration. It is your duty, therefore, to support hope, to preserve tranquillity, and to inspire cheerfulness, even when you are still doubtful of the issue.

*Grief.*—Grief has great influence in producing disease, and in preventing recovery; it lowers the actions of the body, arrests the secretions, particularly that of the liver, and at length produces a slow feverish state. The two worst forms of disease to which the human form is liable (cancer and fungus) are frequently produced by grief and anxiety: how often have I known a mother watch her child in anxious suspense, under a long-continued disease; and although, at length, gratified with its recovery, has soon after perceived a tumour in her breast, which becomes the cause of her own destruction: on the other hand, a mother, bereft of all she dearly loved, under the grief arising from her loss, has an incurable disease produced, which soon terminates her life of sorrow. In the treatment of accidents, grief often so depresses the system, as to destroy all the efforts of restoration.

*Anger.*—Anger has the effect, frequently, of disturbing the healthy actions of the body, and of retarding the progress to recovery. I was attending a man who had an ulcer, which I had several times brought to an healthy state; but when I had given an opinion that it would soon be cured, I found, on the following day, when I saw the patient, that the sore was irritable and inflamed, and that I had my labour to begin again. This occurred several times; at length I was informed, that my patient was exposed, in his family, to sources of great mental irritation; I therefore directed him to take an apartment distant from the causes of angry excitement; and he then, under the same treatment, recovered without any further relapse.

*Fear.*—But fear has the greatest influence in destroying your best efforts to cure injuries or diseases. Often have I known patients declare, after an accident, that they were sure they should not recover; and they seemed to be deprived of all restorative power. Not long since, a person came to me from the country, and described his symptoms, which induced me to believe that he had a stone in his bladder; I sounded him and found a stone.—When I informed him he had the stone, he said, “I hope not, for I can never submit to an operation.” I prescribed some medicine for him, and he returned into the country, where he died in a few days after.

During the period of my residence with Mr. Cline, a lady consulted him for a tumour in her breast, which he recommended to be removed. She said, she was sure that the operation would kill her; but it was observed, that the removal of such a tumour was generally attended with little danger. Although unwilling to submit, and strongly impressed with the idea that the operation would

be fatal in its issue, her friends prevailed upon her to consent; and, when I mention Mr. Cline as the operator, it is unnecessary to say, that it was done with all that skill and caution could effect. She died on the same day, only an hour after the operation; and it was found, that she had arranged her family and domestic concerns in such a manner, that no confusion should arise from what she thought her inevitable doom.

*Case.*—A child, for some trifling offence, was put, by its school-mistress, into a dark cellar: the child was dreadfully frightened at the idea of being put there, and cried violently during the hour that it was confined. When she returned to her parents in the evening, she burst into tears, and begged that she might not be put into the cellar; the parents thought this extremely odd, and assured her that there was no danger of their being guilty of so great an act of cruelty; but it was difficult to pacify her, and when put to bed she passed a restless night. On the following day she had fever, during which she frequently exclaimed, “Do not put me in the cellar.” The fourth day after, she was brought to my house in Broad-Street, in a high state of fever, with delirium, frequently muttering, “Pray do not put me into the cellar!” and when I inquired the reason, I found that the parents had learnt the punishment to which she had been subjected. I ordered what I conceived likely to relieve the fever, but the child died in a week after this unfeeling conduct.

The following is also a curious example, given in the words of a child, aged ten years. “I wanted to write my exercise, and to scrape my slate pencil, and went into the school in the dark to fetch my knife; when one of my school-fellows burst from behind the door, to frighten me. I was exceedingly terrified, and it made my head ache. On the following day I became deaf; and, on the next, so deaf as not to hear the loudest talking.”

In this state she continued in June 1824, three months after having been frightened; at which time I saw her. She had been previously under the care of Mr. Hodgson, of Birmingham.

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## LECTURE II.

### ON INFLAMMATION.

*The restorative principle.*—INFLAMMATION is the means by which local injuries are repaired, and it may be therefore considered as the restorative principle. Its presence is usually indicated by the four following signs; viz. 1st, by an unnatural redness in the inflamed part; 2d, by pain; 3d, by increased heat; and 4th, by swelling: these marks of inflammation admit of a very ready explanation.

*Redness.*—1st. Redness: that this arises from an increased de



termination of the red particles of the blood into the part, may be distinctly seen, when inflammation is superficial, as in the tunica conjunctiva of the eye; and that it is the result of a dilated state of the vessels is readily ascertained by injecting parts, in which the vessels are naturally of small diameter, as the injection in inflammation easily passes into vessels, which would not before have received it; as, for example, by the injecting an inflamed peritoneum, pleura, or tendon, which is a part naturally possessing but little vascularity.

*Sensibility.*—2d. Increased sensibility arises from the extension of the nerves, by the greater quantity of blood determined to them. Parts naturally endowed with little sensibility are quite the reverse when in a state of inflammation. I was called a short time since, to a case in which it was necessary to saw off a small piece of the tibia, after a long continued compound fracture; during the operation, a cavity was opened, in which was a small spicula of bone, embedded in a granulation; the latter was extremely sensitive; the extract of belladonna was applied to it, and gave immediate relief; Indeed, bones, though nearly destitute of sensation in their healthy state, are sometimes extremely sensitive when inflamed.

The degree of suffering in an operation is greater or less according to the absence or presence of inflammation.

Not only is the sensibility of a part increased, but its irritability is exceedingly augmented by inflammation. If an hydrocele be injected when inflamed, it suppurates instead of adhering; and if amputation be performed through an inflamed part, the stump scarcely ever unites by the adhesive process, but passes into a suppurative, and sometimes a sloughing state. An intelligent surgeon, therefore, generally avoids cutting into an inflamed part, from the great pain which it inflicts, and from the restorative process being difficult, on account of the great irritability of the inflamed surfaces.

*Heat.*—3d. Increased heat:—Mr. Hunter denied this: he made an incision two inches deep, in the gluteal muscles of an ass, and into the wound he introduced a tin canula,  $1\frac{1}{2}$  inch long, so that there was half an inch of wound below the canula; he then passed a plug of wood through the canula to the bottom of the wound, and confined it there, so as to prevent an union of the muscles: this was on a Wednesday. Immediately after the wound was made, a thermometer was introduced into it, and the mercury rose to  $100^{\circ}$  exactly, as another did at the same time, which had been passed into the vagina. On the next morning the plug was taken out and the ball of the thermometer introduced to the bottom of the wound; the mercury rose to  $100^{\circ}$ : the plug was then again returned, and secured as before. In the evening the experiment was repeated with the same result. On Friday morning, the thermometer, when introduced, rose to  $99^{\circ}$  only; and, in the evening, it rose to  $101\frac{1}{2}^{\circ}$ . On Saturday morning, when introduced again, the mercury reached  $99^{\circ}$ : in the evening  $100^{\circ}$ .

Similar experiments were made on dogs, with the same results.

It appears also by Mr. Hunter's experiments, that the temperature indicated by the thermometer, when inflammation was excited in the rectum or vagina of an ass or a dog, was not greater than that existing in an healthy state of those parts.

But although no increase of heat is evinced in internal inflammation, yet when the inflammation is seated on the surface of the body, in which the temperature varies much, and is below  $98^{\circ}$ , an alteration sometimes of seven degrees takes place; as on the inside of the thigh, on which a blister was applied, the thermometer rose to  $90^{\circ}$ , whilst on the inside of the opposite thigh it only reached  $83^{\circ}$ : in another instance it rose only  $4^{\circ}$ , but in every experiment the temperature was increased.

*Swelling.*—4th. Swelling.—Is occasioned in part by an increased determination of blood to the diseased spot, distending the vessels; but it also depends on effusion of the fibrin of the blood, which, in coagulating, separates a serum into the surrounding cellular tissue.

Inflammation has four terminations.

*Adhesion.*—1st. In adhesion. This arises from fibrin being thrown into the cellular membrane, and the parts becoming glued together by it. It had been supposed that it was albumen which was poured out in inflammation; but in examining this subject with care, it is found that the character of the effused substance, in all respects, resembles the fibrin of the blood, and by this substance are the edges of the divided parts reunited.

*Suppuration.*—2d. Suppuration or secretion of pus. This is composed of particles nearly similar to those of the blood, only differing in colour, swimming in a fluid resembling serum, and coagulating, as serum does, when exposed to the influence of heat.

*Ulceration.*—3d. Absorption or ulceration, which arises from an increased action of the absorbent vessels, produced by pressure united with inflammation, by which the constituent parts of the body become partially absorbed.

*Gangrene.*—the 4th effect is the destruction of the life of the inflamed part. From excessive action the arteries are first enfeebled, and then their vitality is destroyed; the blood coagulates in them, and gangrene of the part is produced.

*Constitutional effects.*—These are the local effects; and the constitutional, which accompany them, are the different symptoms of irritation mentioned in the preceding Lecture.

*Inflammation of textures.*—Inflammation produces different results, as it is seated in the various component parts of the body. When seated in the skin, it usually becomes extensive, because the surface is unbroken. Its colour is very florid; it separates the cuticle in the form of a vesication, which usually contains serum, but also, in some cases, fibrin; a serous effusion is also produced by it into the subjacent cellular tissue. In some instances, it is preceded by fever; in others, produces it. The skin is also liable

to eruptions of various kinds; some acute, others chronic; some constitutional, others local only: some devoid of any infectious quality, others strongly possessing it.

*Cellular membrane.*—In the cellular membrane inflammation produces an effusion, which obliterates or fills its cells; if it proceeds, it occasions suppuration and produces an abscess, the contents of which are discharged by the process of ulceration. In debilitated irritable constitutions, inflammation kills the cellular tissue, and produces carbuncle, which is a sloughy abscess in the cellular tissue: when chronic, it occasions tumours of various kinds, as the steatomatous or adipose; or, under peculiar circumstances, those of a malignant nature, as scirrhus, fungus, &c.

*Fasciæ mistaken for erysipelas.*—Inflammation of fasciæ is generally extensive, from the large surfaces they present; they are often seen inflamed in compound fracture, producing redness of the skin to a considerable distance, and it is a very unfavourable sign in this accident. When matter is produced by inflammation of this texture, and is seated under it, great irritative fever succeeds, until it be discharged; as, for example, in the palms of the hands or soles of the feet.

*Muscles.*—Muscles are known to be in a state of inflammation by the spasmodic twitchings which accompany it; for instance, in a few hours after a simple fracture, when the limb has been carefully adjusted, it becomes disturbed by involuntary convulsive catchings, occurring when the patient is going to sleep, or awaking from rest.

*Tendons.*—Tendons are apt to inflame to great extent. They do not easily inflame; but when they do, for example, in the finger, the fore arm swells, is red, and matter forms in the course of the tendon, which sloughs to its junction with the muscle, in some cases; but in all to a greater extent than the surrounding soft parts. Punctured wounds of tendons are apt to produce tetanus, more than wounds of other parts of the body. Matter formed under tendons burrows to a great extent, and produces violent irritation, as under the tendon of the occipito frontalis muscle, and under the covering of the temporalis.

*Absorbent.*—Inflammation in the absorbent vessels is marked by red lines, being formed on the skin in the course of these vessels. From the skin participating in the inflammation, they form hard cords from the effusion which surrounds them, and knots are felt in these cords from the enlargement at their valves. Their glands generally partake of this inflammation, and both the vessels and the glands occasionally suppurate. They more frequently inflame from common irritation than from the absorption of poisons.

*Arteries.*—The arteries rarely inflame, excepting from wounds or ligatures. Inflammation in them sometimes extends even to the heart, when a ligature is applied on one of them in a person of bad constitution. I was present when Mr. Cline opened the body of a man who had a ligature put on his femoral artery near the groin.



and who died at the end of the second week from the operation. The internal surface of the artery was inflamed, as also that of the external and common iliacs; and the aorta had a florid redness on its inner surface, as far as the valves of the heart.

*Case.*—A man, whose leg I had amputated, had a low muttering delirium, in which he rose from his bed and stood on his remaining limb; great irritative fever followed, and, what I have generally observed in inflammation of the blood-vessels, pain in bending his different joints, from its changing the position of the vessels. He died; and when I opened his body I found suppuration in the artery, for the space of two inches, above the ligature on the femoral, and inflammation of the inner coat of the arteries, in the parts in which I examined them.

*Veins.*—Veins, inflamed from wounds, form hard and broad cords, extremely tender to the touch, and if from bleeding, from the wounded part to the axilla. I have seen several patients die from this cause; and in the greater number the bleeding was required for dyspnœa. Upon examination, the inner coats of the veins are found adherent, and I have seen suppuration in the vein; and once an abscess in the longitudinal sinus of the dura mater (which is a vein in function,) of which we have a beautiful specimen in the anatomical collection at St. Thomas's Hospital. When veins inflame from ligatures, they generally do so more below the ligature than above it, and excessive distension, from the interruption to the return of the blood, seems to be the cause of this circumstance. I have seen several persons die from ligatures being put on one of their veins, and the appearances on dissection were excessive distension from accumulated blood below the ligature, adhesion above the ligature, and a red internal surface extending towards the heart.

*Nerves.*—Nerves are very rarely inflamed; but when it happens, the pain is excessive, and there is a tingling feel in the parts to which the nerve is distributed; but there is no redness of the skin, although great tenderness to the touch. Wounds of nerves, though dreadfully painful at the moment, are followed by little irritation. The wife of a medical gentleman was obliged to have the posterior tibial nerve divided, which I did in the presence of Mr. White, surgeon to the Westminster Hospital, for a painful tumour on the nerve: although the operation was dreadfully painful, and the pain shot through the brain, spinal marrow, and the nerves proceeding from it, yet it did not affect the nerves of the grand sympathetic, immediately or remotely, or produce any serious irritative fever. I have also had occasion twice to remove portions of the sciatic nerve, and but little constitutional irritation followed. Severe pain takes place sometimes in the course of the nerves; but whether it be from inflammation or not, I have not been able to ascertain by dissection. When the pain is excessive, it is called *tic douloureux*. I am inclined to believe that this disease is not inflammatory, from

the stimulant nature of the remedies which are found most efficacious in it, as carbonate of iron, bark, and arsenic.\*

*Ligaments.*—Ligaments, like tendons, are not very prone to inflammation in healthy constitutions; but the synovial membrane, which lines them, is highly so, and the inflammation has great tendency to the suppurative process. In scrofulous persons, the synovial surface becomes inflamed, and the ligament covering it thickens, so as to produce great enlargement of the joint.

*Cartilages.*—Cartilages in joints ulcerate from inflammation, and often become entirely destroyed.

*Bones.*—The bones being composed of a cartilaginous substance (like that which supplies the place of bone in the very young subject,) and of phosphate of lime, and the former having arteries, veins, and absorbents entering into its composition, is, like other parts of the body, liable to inflammation, which produces adhesion of bone to bone; and in fractures, the adhesion or union of the broken portions; in suppurative inflammation, abscesses; and by ulceration is the matter discharged: death, or mortification of bone, is also the frequent result of inflammation; and the dead bone sloughs, or exfoliates, whilst new bone supplies the place of that which is removed, or is to be separated.

*Membranes.*—Exhalent membranes, when they inflame, are naturally disposed to adhere; whilst mucous surfaces, under inflammation, pass into the suppurative inflammation. This circumstance was first clearly explained by Mr. Hunter, and since has been dilated upon by Bichat.

*Healthy inflammation.*—Inflammation is healthy or unhealthy; it has been too much regarded as a disease, for no wound can be repaired without inflammation; even the little puncture, made by the lancet in bleeding, would invariably destroy life if this salutary process did not prevent it. A slight inflammatory action throws upon the edges of the wound adhesive matter, by which they are permanently united and the divided parts closed. So, when a ligature is put upon an artery, unless inflammation supervened it could be of no use in preventing secondary bleeding; the first thing nature does in this case is to form a clot of blood in that part of the vessel which has been tied, inflammatory action succeeds, adhesive matter is thrown out, and the clot of blood is united to the internal coats of the artery so as to prevent an hæ-

\* I have seen an affection of a nerve very similar to *tic douloureux* produced from injury: it was in a French officer, who had been shot through the leg at the battle of Waterloo: the anterior tibial nerve was wounded, and after the part had cicatrized he became subject to excruciating pain in the course of the nerve to its sentient extremity, whenever he put the muscles in action by attempting to walk; or it might be produced by irritating the surface of the integuments immediately over the distribution of the nerve. Various forms of counter-irritation, and also different constitutional remedies were tried, without affording relief. He would not submit to excision of the diseased portion of nerve, and left Brussels still suffering severely from this affection.—T.

morrhage when the ligature separates. Should the constitution, however, be unhealthy, this process would not be completed; and when the ligature separates, the person sometimes dies of hæmorrhage. Of this we have an excellent specimen in the collection, taken from the stump of a person who died of hæmorrhage. The clot within the vessel adheres to it on one side but not on the other. Inflammation in a healthy constitution, is a *vis medicatrix naturæ*, established for the purpose of restoration; but the inflammation which arises without any obvious cause, is an evil without any corresponding advantage; it is of an unhealthy kind, and arises from an irritable constitution, and from the enfeebled state of the affected part.

*Acute or chronic.*—Inflammation is either acute or chronic. The first passes through its stages with rapidity, while the latter is exceedingly slow in its progress. The chronic is either the result of acute inflammation, or is owing to a peculiar state of constitution; as that which occurs in persons who have lived intemperately, or in those who have been exposed to excessive and laborious exertion, or who are the victims of anxiety and of disappointment.

*Acute.*—One of the best examples of acute inflammation is seen in the breast after lying-in; the adhesive stage is marked by hardness and pain. The suppurative, by irritative fever, fluctuation, and throbbing or pulsation; ulceration usually quickly succeeds, and the matter is soon discharged.

*Chronic.*—The termination of acute inflammation in chronic, is well seen in ophthalmia. When consulted in a case of this description, during the acute stage of inflammation, you will take away blood, both locally and generally. This may be done either by opening a vein in the arm, by the application of leeches to the *palpabræ*, or by opening the temporal artery, or arteries, which sometimes relieves from its free anastomoses with the ocular vessels.\* The local applications should be such as soothe and allay local irritation, for which purpose emollient and narcotic fomentations are most appropriate. When by such means the acute inflammation has been subdued, it frequently happens that the chronic begins. In the acute stage, our object was to decrease power, but now it is required to stimulate the vessels, to contract their diameters, to diminish the quantity of blood which has accumulated in them, and thus restore them to their natural state, and this is best effected by astringent and stimulating lotions; as the

\* I have frequently observed, that the abstraction of considerable quantities of blood from the temporal artery, in cases of severe ophthalmia, has produced little or no relief. On mentioning this to other gentlemen who are in the habit of treating ophthalmic diseases, I found several of them had remarked the same circumstance, which may be accounted for in the following manner:—The branch of the temporal artery generally opened is the frontal branch, which anastomoses with the superorbital; and the usual method of stopping the flow of blood is to divide the branch which has been punctured, thus the anastomosis is cut off; and the blood, which before passed off in part by the divided vessel, is thus determined to the affected organ.—T.



solutions of alum, sulphate of zinc, nitrate of silver, &c.; and as the depletion necessary to check the acute form of the disease, may have produced general debility, medicines will be required to increase the tone of the stomach and to give vigour to the circulation.

Another example of chronic inflammation succeeding the acute may be witnessed in gonorrhœa; at first it is necessary to check the violent action in the vessels of the urethra, but you are afterwards obliged to excite action by giving the balsam of copaibæ; and frequently slight stimulating injections are employed in this stage of disease.

*Common or specific.*—Inflammation is common or specific.

The first, with its terminations, has been already described, and is called healthy inflammation. But the second, or specific, is of a peculiar kind, and is always unhealthy.

*Specific.*—In specific inflammation the vessels have a different action to the healthy; and thus, the fluids and solids which they produce have not the usual character.

There are two descriptions of specific inflammation; one produced by a peculiar condition of constitution, and the other by the application of a poison. Gout is an example of specific inflammation. If a man, for a length of time, yields to every kind of injurious excess, loading his stomach with food and wine, so as to weaken the digestive powers, he will probably excite what is called the gouty disposition; he experiences dreadful pain in one or more of his joints; severe inflammation appears, which terminates in the secretion of a matter, becoming solid, usually called chalk-stone; the name, however, is incorrect, as it has been proved by the analysis of Dr. Wollaston to consist of uric acid and soda; consequently is now named urate of soda.

The formation of scirrhus, or cancer, is another example of specific inflammation, arising from a peculiar state of constitution. Let us suppose that two women receive each a blow on the breast, one with a healthy and vigorous constitution, and the other with a system worn down with care, anxiety, and disappointment, and in a constant state of chronic feverish excitement, in which the secretions are imperfectly performed, and is thus predisposed to the formation of cancer: in the first individual, the inflammation produced will be strictly healthy, going through its different stages, until the cure is accomplished; but in the other, owing to constitutional peculiarity, the same extent of injury will produce cancerous disease; an affection over which all remedies, hitherto tried, have little control, and extirpation is but an uncertain mode of relief. The fungous disease, called by Mr. Hey fungus hæmatoides, and by others named soft cancer, pulpy tumour, &c. is in some respect similar to the former in its cause, but different in the action of the part, and in the effusion by which it is followed.

But the best example of specific inflammation is scrofulous. Persons subject to this peculiar form of inflammation have gener-

ally very fair complexions, and delicate appearance; this state of constitution is engrafted at birth; and when inflammation occurs, it is slow in its progress, although easily excited; and the result is sometimes a sceretion of curdy matter; at others, of a thin serous fluid, resembling but little the pus which is formed in healthy inflammation.

*From poison.*—The second kind of specific inflammation is that which is produced by the application of poisons. Thus, in gonorrhœa, the matter secreted is widely different from common healthy matter, having a large quantity of mucous mixed with it; and, secondly, when applied to another mucous surface, it is capable of exciting an action by which similar matter and the same effects are produced. The matter of small pox occasions similar results. As far as constitutional effects are concerned, it does not seem to be essential in what quantity the poison is applied: the result in each case will depend upon the state of the constitution.

*Irritable inflammation.*—There is another kind of inflammation, which I would call the irritable; in this disorder the blood-vessels are much less affected than the nerves. You are called to attend a person, who tells you that he feels in the hand, arm, or some other part, most agonizing pain: if not experienced in these matters, you will be inclined to doubt the correctness of your patient's statement, as you cannot discover any diseased appearance of the part. Some time ago I was consulted by a lady who had this painful affection in the foot, and I employed various remedies without her being relieved: finding no improvement, and suffering in health, she went to the coast, and there used a steam bath; and, without any further means, the pain quickly subsided. The eyes are very subject to this torturing disorder. But no part is more frequently attacked by it than the breasts of young women. It produces such a degree of tenderness, that they cannot bear the slightest pressure: the pain extends to the shoulder, down the arm, and even to the elbow and fingers, accompanied by constitutional irritation. To cure these pains, and general derangement, such medicines must be given as will influence the secretions, but especially that of the uterus. This irritable inflammation sometimes attacks the testicles, rendering them extremely sensitive, so that the patient can scarcely sustain the pressure of his clothes. It is attended with little increase in the size of the gland. I have been obliged to remove the testicle in three persons for this disease. The subject of one of these operations was a gentleman from South Carolina; he came to England for advice, and consulted many of the surgeons in London, but without experiencing any relief of his sufferings, from the various remedies they advised. He at length requested me to remove the torturing part; this I did, and he returned to his native country quite well. The bladder is also occasionally disordered by this irritable inflammation, and the symptoms, in many respects, resemble those of stone; in both cases there is pain in making water, and blood is sometimes mixed with the urine. The grand dif-

ference in these two cases is this; the irritable bladder is most painful when distended; that which contains a stone, when emptied. On dissection, the inner coat of an irritable bladder has been seen the colour of red velvet. I have known this irritable inflammation attack the rectum, and produce excessive suffering, which was relieved by large doses of soda.—Soda, rhubarb, and the compound powder of ipecacuanha, are the best remedies.

*Cause of inflammation.*—Inflammation sometimes arises from debility, and this state is frequently seen in the lower extremities of old persons in whom the blood returns to the heart with difficulty; from weakened power, the arteries are called upon for unusual exertion, and inflammation of the skin succeeds, frequently attended with incrustations and a serous discharge, and sometimes with a watery secretion into the cellular texture.

An irritable constitution is most prone to inflammation; and, when produced in it, is more dangerous and extensive. Some persons are naturally irritable, others become so from disease. Thus, in fever, when the constitution has suffered much, the parts on which the body rests become inflamed and mortify. But in fractures, where the system is healthy and vigorous, although the patient remains many weeks in bed, no such effects are produced. Where there is great irritability, inflammation is always dangerous; the application of a blister to the chest of a child, for the removal of a cough after measles, frequently in this town, destroys life, by producing gangrene. So mercury, by rendering the body irritable, disposes it to inflammation; and it is wrong to operate on a patient immediately after a mercurial course, on account of this inflammatory tendency.\*

*Exciting causes.*—The exciting causes of inflammation are whatever produces an unnatural state of a part, calling upon nature for its reparation, which it effects by the process of inflammation; as bruises, cuts, pressure, extraneous substances, &c. The manner in which nature repairs these injuries will hereafter be more particularly described.

*The proximate cause of inflammation.*—The state of the blood does not tend to the production of inflammation; and the opinions formerly entertained of the increased thickness of this fluid in inflammation are now known to be diametrically opposed to the fact, as the blood is rendered more than usually fluid by it.

If a part which is the subject of inflammation be examined, the following are the appearances which I observe:

The tail of the tadpole is the best transparent part of an animal for making these observations: in the web of the frog's foot the vessels are less conspicuous. When the tail of the tadpole is

\* A young woman in our Hospital, who had passed through a course of mercury, had a fatty tumour removed, and died of erysipelatous inflammation, brought on by this simple operation. A man had a musket ball extracted from his arm whilst under a course of mercury, and had severe erysipelas produced in consequence.



placed under the microscope, a surface appears intersected by rivulets of blood, in which the red particles may be seen rolling on in a most beautiful current. The part is now irritated either by slightly wounding it, or by the application of an acid; almost immediately the velocity of the circulation appears to be increased; in a few minutes little branches of vessels appear to be growing out of the sides of those before visible, into the transparent part; these vessels are now seen receiving a red particle, or particles of blood, which gradually advance in them, forced forwards by a vis-a-tergo, until they reach the beginning of the corresponding vein; and then this vessel being larger than the artery, the red particles rush from the artery into it, and thus a new vessel appears to be created under the eye. It is not however, a new vessel, but a serous artery, which by the force of the action of the heart and of the surrounding vessels, becomes dilated, so as to receive red particles. When the red particles are observed in the vessel, they seem to advance by the pulsation of the heart, and then slightly to retreat; but not in proportion to their advance, and thus they gradually proceed.

The vessels of the inflamed part, on this account, appear to become more numerous; but it is only that they can now be seen from the difference of the fluid which they contain. They become very considerably dilated, and they seem disposed rather to yield than to contract. This is what can be with certainty observed in these animals.

With respect to man, we observe, that if a drop of nitric acid be applied on any part of the body, in three or four minutes a rush of blood takes place into the part, and it becomes red. In the parts near to that inflamed, a strong feeling of pulsation is produced, showing that the action of the surrounding vessels is increased; and the heart, sympathising with it, has the velocity and force of its action augmented.

The vessels of the inflamed part then are found to be dilated, but the arteries feeding the inflamed part are also dilated; so that if a limb be injected, in which there has been any considerable extent of inflammation, the principal vessels, as well as their branches, have their diameters increased.

Inflammation is, therefore, a dilated state of the vessels of the part, an increased action of those in the surrounding parts, and the heart sympathising with the part determines a larger quantity of blood to the dilated vessels.

*Illustration.*—This process may be illustrated by what is frequently occurring in the organ of vision; a piece of iron lodges upon the eye, and becomes a source of irritation. A flow of tears is produced by the increased action of the lachrymal gland, to wash away the cause of irritation. So an irritation upon other parts of the body leads to the determination of blood to the part, to remove by subsequent processes the irritating cause.

## LECTURE III.

## TREATMENT OF INFLAMMATION

THIS is either constitutional, local, or both combined.

When any important organ is directly injured, or its functions disturbed in consequence of the influence of the injury upon the constitution, the treatment must be necessarily constitutional. No vital organ can be deranged in its functions, without producing a general disturbance in the system; and this will be greater or less, in proportion to the importance of the part injured, the extent of the injury, and the nature of the person's constitution.

*Bleeding.*—The most powerful constitutional means of relieving inflammation is, by the abstraction of blood. Its beneficial effects principally result from its producing a diminution of nervous power; and that it does so, is proved by the syncope which it occasions. Sometimes the removal of a very small quantity of blood will occasion not only suspension of all the voluntary functions, but of the mental powers.

*Its modus operandi.*—Fainting, however, cannot be easily produced, unless the patient be in the erect or sitting position whilst the blood is abstracted; for it is the loss of this fluid by the vessels of the brain, which is the immediate cause of fainting. To prove this, when a person faints, place him in a recumbent position, and let his head be situated a little lower than his body, to facilitate the passage of the blood to the brain, and in a very short time after being thus placed he will open his eyes, and all his faculties return.

The second mode by which bleeding relieves, is by lessening the momentum of the circulation; for when there is great distension of the blood-vessels, the momentum will be necessarily great, and consequently the vital fluid will be thrown with great force, not only on the inflamed part, but on all the organs of the body.

*Indication for bleeding.*—The indication for general bleeding is a hard pulse. In this state of pulse the diameter of the vessel is diminished, yet its action is exceedingly strong, and each pulsation feels like the vibration of a wire; therefore, when you find this description of pulse, you will be justified in taking away blood. The hardest pulse is that which is produced by inflammation of the heart; in inflammation of the lungs and of the brain the pulse is hard, but not equally so with that which arises from inflammation of the heart.

When the stomach or intestines are inflamed, the pulse is hard, but is often so small as to be scarcely distinguishable. Persons unacquainted with this fact are afraid to take away blood, although it is imperiously required, on account of the paleness, depression of strength, and smallness of pulse; as, for instance, in strangu-

lated hernia. This observation also applies to peritoneal inflammation.

Quickness of pulse is not in itself a sufficient proof that bleeding is required; but when united with hardness, no additional evidence of its necessity can be wanted; therefore do not bleed when there is a quick pulse, unless, at the same time, it is hard; for a quick pulse is in itself a proof of irritability, which bleeding will increase.

The indication for a repetition of bleeding is said to be a buffy state of the blood; but your decision must not be governed by this appearance alone, for you must still have regard to the pulse.

When blood is cupped or hollowed upon its surface, it is said to be a proof of inflammation, and that bleeding should be repeated; but the following case will show, that even a cupped state of the blood, and buff conjoined with it, are not sufficient evidence that venesection may be repeated. A patient in Guy's Hospital, in the last stage of scurvy, whose blood-vessels were so weak, that a slight pressure on the skin produced ecchymosis, whose gums frequently bled, and whose pulse was exceedingly quick and feeble, had a very small quantity of blood taken from his arm as an experiment; after standing for a few hours, it became not only buffy, but considerably cupped. I had this blood preserved, on account of the commonly supposed inflamed appearance; but the blood will be buffy, and lose its red particles, in coagulating, from quickness of action only: when you contemplate a repetition of blood-letting, it may be of importance to keep this observation in your remembrance. If the quantity of serum be very large, unless there are other indications for bleeding, this circumstance is an evidence against the repetition of blood-letting.

*Quantity taken away.*—The quantity of blood usually taken away at one time in inflammation, in an adult, may be from ten to twenty ounces; but must vary with the degree of inflammation, the importance of the organ inflamed, and the state of the constitution.

When compared with the solids, the quantity of blood which can be drawn from an animal, before it dies, is about one part to sixteen. A small dog, weighing fourteen pounds, had its jugular vein opened; from this eleven ounces were discharged when the dog fainted; the carotid artery was then divided, and from this source three ounces more were obtained, and no more could be drawn. Thus fourteen ounces of blood were removed from a dog weighing fourteen pounds; so that one ounce of blood to one pound of solids, was the proportion drawn.

*Mode of bleeding.*—When you bleed to relieve inflammation, the blood should be abstracted as rapidly as possible; therefore, the orifice made into the vessel should be of considerable size; for if allowed to flow slowly, the vessels have time to accommodate themselves to the diminished volume of circulating fluid; so that the system feels but little the gradual abstraction of blood. The grand object is, to produce a tendency to fainting, and in some cases complete syncope; to effect which blood must be suddenly



withdrawn. But in very delicate persons the loss of a small quantity of blood will subdue inflammation: a gentleman who has been for many years subject to inflammation in his lungs, is usually relieved by the loss of six or eight ounces of blood.

*Case.*—You may bleed, so as to produce constitutional and local effects at the same time. A patient of Mr. Foster's, in Guy's Hospital, who had concussion of the brain, suffered afterwards continued pain in his head, and had considerable constitutional irritation; blood was abstracted from the external jugular vein, and immediately the pain in the head ceased, and did not afterwards return.

When you are required to take charge of patients suffering from an injury, which demands a length of time for its restoration, you must be exceedingly careful how you take away blood from the system generally, but must in preference adopt local bleeding; for if, as I have observed, you adopt a system of free depletion, nature will not be equal to the restoration of the injured parts, and the most disastrous consequences follow the indiscriminate employment of blood-letting. There is not a greater error than this in the practice of surgery.\*

*Secretions restored.*—The second mode of relieving inflammation, is by restoring the secretions; for whenever inflammation occurs, at least in a violent degree, all the secretions are diminished or suppressed. The most important secretions are those of the liver, intestines, skin, and kidneys; and when these cease to perform their proper functions, irritative fever is the consequence. A deficiency of secretion from the alimentary canal is the cause of a great number of the diseases to which human beings are subject. The internal surface of the intestines is lined by glands; the tube itself is on an average twenty-seven feet in length, and three inches at least in circumference; so there are here near one thousand inches of surface, from which, in health, continual secretion proceeds. What, then, must be the result of allowing so extensive a secreting surface to remain inactive? the producing and continuance of constitutional irritation. To excite the intestinal canal, and to restore its action, is, therefore, one of your principal objects: this may be done by purgatives. Purgatives afford relief in nearly the same manner as the abstraction of blood from the arm; for a pint of serum will pass off with the *scæces*, after taking a brisk cathartic.

\* A stout man was admitted into Guy's Hospital, having a simple fracture of the tibia, with considerable contusion of the surrounding parts; a day or two after his admission, he had severe constitutional irritation, and acute pain, with spasmodic action of the muscles near the seat of injury. To relieve these symptoms, the dresser was directed to take some blood from the arm of the patient, which he did; but thinking it proper that faintness should be produced, as a proof of its effect on the constitution, and forgetting that the patient was in a recumbent position, he abstracted so large a quantity of blood, that all power of restoration was completely annihilated, and the man died.—T.

Purgatives have likewise another excellent influence, independently of restoring the intestinal secretions, by carrying off whatever fæculent matter is lodged in the intestines; but I do not believe that much irritation is produced by the accumulation of fæces, in comparison with that which originates from the secretions being arrested. I have met with several cases, in which an almost incredible quantity of fæces had collected, yet it produced but little constitutional irritation. Accoucheurs frequently witness similar cases. In one instance which fell under my observation, the pressure was so violent, that it produced ulceration into the vagina; yet the enormous quantity of fæculent substance excited but little constitutional irritation; some fluid formed a passage by the condensed mass, and was daily discharged; this in a great measure, accounts for the absence of irritative fever.

That it is from the check to secretion, that irritative fever arises, is proved by what occurs in children during dentition; they are sometimes put to bed quite well, yet in the morning an arm, leg, or both legs, are paralyzed, from the irritation of a tooth, the secretion from the intestines stops, fever is excited, and produces a hot and dry skin; but restore these secretions by administering purgatives and antimonials, and the irritative fever quickly subsides, although the paralysis will sometimes continue with little alteration for life.

There is another mode in which purgatives produce a beneficial effect in inflammation, by irritating the intestines; blood is determined to them, and it is abstracted from the part inflamed; upon the acknowledged principle, that two increased actions proceed, with difficulty, in the body at the same time.

*Action on the liver.*—It is of little use to produce action in the intestines, unless you also excite the secretion of the liver; therefore, give mercurials with your saline medicines, as these produce secretion of bile: do not give saline aperients alone, which act chiefly upon the intestines; the best plan is, to administer some mercurial medicine at night, and a purge in the morning. An excellent purge for an adult is, one grain of calomel with four of cathartic extract, or two grains of blue pill, with three of extr: col: comp: castor oil may also be recommended; and as another safe opening medicine, you may prescribe—*Infus. sennæ with magnes. sulphas.*

In children, calomel with rhubarb, scammony, or antimony, may be ordered as aperients; and in addition to these means the use of injections and the warm bath are the best means of restoring the secretions of the digestive organs. An old Scotch physician, for whom I had a great respect, and whom I frequently met professionally in the city, used to say, as we were entering the patient's room together, "Weel, Mister Cooper, we ha' only twa things to keep in meend, and they'll searve us for here and herea'ter; one is always to have the fear of the Laird before our ees, that 'ill do

for herca'ter; and the t'other is to keep your boeels open, and that will do for here."

*Mode of preserving health.*—The means by which I preserve my own health are, temperance, early rising, and spunging my body every morning with cold water, a practice I have pursued for thirty years; and though I go from this heated theatre into the squares of the Hospital, in the severest winter nights, with merely silk stockings on my legs, yet I scarcely ever have a cold; should it happen, however, that I feel indisposed, my remedy is one grain of calomel combined with four of cathartic extract, which I take at night, and a basin of hot tea, about two hours before I rise the following morning, to excite a free perspiration, and my indisposition soon subsides.

*Perspiration.*—The next secretion we should endeavour to restore, for the purpose of relieving inflammation, is that of the skin, for it rarely happens that a hard pulse continues with a free secretion from the surface of the body. It operates by evacuation of the serous parts of the blood, and by determining blood to the surface, removes it from the inflamed parts.

The best mode of producing perspiration, to which bleeding and aperient medicines greatly conduce, is by administering the antimonial powder, with diluents; or the compound ipecacuanha powder (Dover's powder); the latter is apt to produce costiveness, therefore the antimonials are the best. Antimonials appear to act with more certainty when given in conjunction with small doses of mercury: calomel and antimony, with the exhibition of the warm bath, either partially or generally, will in most cases produce the desired effect.

*Urinary secretion.*—The other secretion, that of the kidneys, may be restored by giving diluents, squills, or acetate of potash.

When, after bleeding and administering aperients, the inflammation is not reduced, but the pain increases, and the pulse acquires a jerking or palpitating feel; do not bleed again generally, but give calomel and the compound powder of ipecacuanha to lessen the nervous irritability, and to open the intestinal and cutaneous pores. I had thrice bled a very irritable patient on account of an inflammation of the testicle, yet the pain increased, and the artery at the wrist was raised with a jerk at each pulsation; he was quickly relieved by taking Dover's powder with calomel. The inflammation in such cases is supported by the irritability of the system.

*Nausea.*—There is another mode of subduing inflammation, by giving a solution of tartar emetic, in small doses, so as to create a constant state of nausea. This plan is often successful in croup; but calomel is also to be occasionally administered.

When inflammation occurs in old people, you must bleed with the greatest caution. An elderly lady, having inflamed lungs, was ordered to be bled; the bleeding was repeated, and effusion



into the cellular texture of the legs soon followed. *Digitalis* was prescribed for her, combined with spir. æther nitric. which reduced the inflammation, occasioned the absorption of the fluid in the legs, and she rapidly recovered.

The means, therefore, which are employed to lessen or remove inflammation, are those which restore the secretions by opening the extremities of the arteries; and thus the heart is prevented from propelling the blood with violence to any particular part of the body.

#### THE TREATMENT OF CHRONIC INFLAMMATION.

The remedies employed, in this case, must have a slow and gradual action on the secretions. You cannot take this disease by storm; and if your medicines act with violence, you will produce mischief instead of affording relief. The principle on which this disease is founded, is the arrest of some of the secretions; and its successful treatment depends upon their restoration.

Chronic inflammation is frequently produced through the influence of the mind on the body; thus long-continued grief will stop the secretion of the bile: anxiety of mind produces disease in the breasts. But whatever is the cause of the arrest of secretion, some congestion is the result; as enlargement of the liver, of glands, or of joints; the formation of common tumours, or those of a specific character, as fungus or scirrhus.

In disease of a chronic kind, give calomel and opium; and I cannot point out to you a better example of its good effects than is observable in chronic inflammation of the joints, or testicle; in the former cases, when assisted by counter-irritation, it is by far the best remedy. The most common medicine, and probably, as a general one, the best that is administered in chronic inflammation, is the pilul. hydrarg. submur. comp.: it acts at the same time on the liver, intestines, and skin; and if you can succeed in restoring their secretions, the disease will disappear, and its effects will be absorbed; for by these medicines, in proportion as you increase the secretions, you excite the action of the absorbent vessels.

Another excellent medicine, for the cure of chronic complaints, is the oxymuriate of mercury (corrosive sublimate), dissolved in nitrous æther, and combined with tincture of bark or of rhubarb, or with the decoction of sarsaparilla; continue it for some time, watching its effects with care, always keeping in mind that mercury, given to excess, will tend to increase rather than destroy constitutional irritation; as sarsaparilla seems to possess the power of lessening irritability, we frequently give it with mercury, and in this combination they are administered with the greatest advantage.

*Chronic inflammation in children.*—Chronic disorders in children require small doses of the hydrarg. c cretâ and rhubarb mixed together, and given every night and morning; this compound is ex-

ceedingly mild, and will have a particularly benign influence. In children also, one grain of the oxymuriate of mercury, dissolved in an ounce of tincture of bark, and given in doses of from half a drachm to one drachm, twice a-day, in water, according to the age and constitution of the child, is a very valuable medicine. It is said, that the oxymuriate is decomposed by the tincture of bark; but whether it is so or not, it is attended with so many good effects, that I strongly recommend it, particularly in diseases of the mesenteric glands. Calomel and rhubarb, the hydrargyrus c̄ creta and soda, are also medicines of much power in the chronic diseases of children.

Lastly, in some cases, it is not advisable to give these little creatures mercury; a medicine composed of rhubarb and carbonate of iron, or of rhubarb, soda, and calumba, given often and in small doses, will be more beneficial, as these act as aperients, improve the digestive functions, increase the appetite, and restore the general health, without the danger of exciting irritation at the moment, or rendering the system afterwards irritable.

#### THE LOCAL TREATMENT OF INFLAMMATION.

The nature of inflammation having been explained, and it being understood that the vessels of the part are in a dilated state, and that those surrounding it have an increased action, I shall now speak of the local remedies. Of the application of cold to an inflamed part, as a means of checking the violence of the inflammation, or of altogether subduing it, much has been said. Cold is not a positive quality, but the abstraction of heat in inflammation affords much relief. If cold be applied to the body generally, it has the power of lessening the frequency of the pulse in an extraordinary degree. I tried this upon myself; I went out of my house one severely cold evening, when I was very warm, my pulse being 86°; at the expiration of an hour it was 76°, and at the end of an hour more it was reduced to 65°; it had not only lessened in quickness but in fulness. Cold will produce torpor of body and mind, by diminishing the excitability of the nervous system: in extreme, it occasions death.

*Anecdote.*—A curious instance of this kind occurred in Nova Scotia; Dr. Scott had been dining with some friends, a short distance from Halifax, and they were on their return home at night, when one of the party separated from the rest, having said to a companion that he would frighten some of them by-and-by. However, they reached Halifax without seeing any thing more of him on the journey, and he had not arrived: at this the party became alarmed, and returned for the purpose of finding him; he was discovered behind a hillock of snow, apparently asleep, in the erect position, but quite dead.

*Anecdote.*—Another circumstance of this kind is related in Cook's Voyages; when some of the officers and crew of one of the

ships landed at Tierra del Fuego. Dr. Solander, who was one of the party, particularly cautioned them not to go to sleep, stating that it was extremely dangerous to do so in very cold situations. It happened, however, that the Dr. himself became drowsy, and it was with the greatest difficulty that his companions could keep him in motion; and it was only by extraordinary perseverance that they succeeded in getting him back to the ship alive.

Cold, therefore, applied generally and gradually for a length of time to a healthy person, diminishes the power of the nervous system, and has the effect of lessening arterial action, both in force and frequency.

When cold is applied locally to an inflamed part, it robs it of its heat, lessens its nervous energy, and diminishes the diameter of the vessels; it must be severe if it reduces the temperature of internal parts below  $98^{\circ}$ ; but in this climate many parts of the body, remote from the source of circulation, vary in temperature from  $20^{\circ}$  to  $30^{\circ}$ : thus, a thermometer applied to the toes when they are cold, will be found to indicate  $20^{\circ}$  less of heat than when it is applied to the calf of the leg. Cold applied to excess destroys life by the great abstraction of heat, heat being necessary in a certain degree for the support of the vital actions.

Thus in the living body you may apply cold to a part until it becomes actually frozen. Mr. Cline and Mr Sharpe were once attending a patient who had a strangulated hernia; to assist the reduction of which they applied ice, enclosed in cloths, and this they continued for thirty-six hours; as the ice dissolved, the parts became completely frozen; proper applications thawed and restored them to life; but inflammation and slight gangrene succeeded: the hernia, however, was reduced, and the man eventually did well.

It frequently happens in more northern climes, during severe winters, that the lobes of the ears and tips of the noses of those who are exposed to the weather will become frozen; they may be restored to life again by rubbing them with snow, the friction restoring circulation, whilst the heat is moderated by the application.\*

\* Mortification of the toes, or of a considerable portion of one or both of the lower extremities, is not an uncommon consequence of exposure to severely cold weather, especially if the person be debilitated, and the action of the heart feeble.

In the winter of 1822, Andrew Tangilon, a Swede, was admitted into St. Thomas's Hospital, on account of mortification of both feet, from exposure to excessive cold, in the Baltic. He had been living for some time on salt provision, to which he was not accustomed. Separation of the mortified parts had commenced when he was brought to the Hospital, and he was in a state of extreme debility. By giving him nutrition and generous diet, his health rapidly improved, and I afterwards amputated both the legs below the knee, at an interval of twelve days. He perfectly recovered, and now works at Mr. Hanbury's refined sugar manufactory, in the Commercial Road.—T.



One of the best lotions that can be applied to an inflamed part, for producing cold, is composed of one ounce of rectified spirits of wine and five ounces of water. Goulard water is also much extolled for reducing inflammation and lessening pain; but when applied too long, or when containing a large quantity of lead, it has been known to destroy nervous irritability in too great a degree. Mr. Foster of Guy's Hospital, saw a person in whom the upper eyelid became completely paralyzed from its improper application.

In applying the spirit of wine in solution, let the linen be fine, and put lightly on the inflamed part, that evaporation may go on with facility; as it is by the abstraction of heat during evaporation that the good effects are produced.

Do not put ice to the inflamed part; it irritates and is apt to produce gangrene. Some years since, when I was making a series of physiological experiments, I wished to ascertain what effects would be produced on the pulse by the sudden application of severe cold, for which purpose I plunged my bare arm up to the shoulder into snow; immediately before the immersion the pulse was  $80^{\circ}$ , and it quickly rose, when immersed, to  $109^{\circ}$ ; this result was contrary to what I expected, and I repeated the experiment. The pulse sometimes did not rise so high, but was small and hard. The exposure to so great a degree of cold caused severe pain, and consequently was a source of irritation.

However, in deep-seated inflammation, as in that of the brain, and in determination of blood to the head, the application of ice to the scalp is of signal service.

*Effects of the cold bath.*—The experiment I have related led me to an examination of the principles of the action of cold bath; and I found, that when a person in health takes a cold bath, not being accustomed to it, it produces irritation, and sometimes renders the pulse irregular: but on the contrary, when a person in a state of irritability and weakness, with a feeling of heat about him, goes into a cold bath, it tranquillizes the nervous system, and therefore is beneficial. It absorbs the superfluous heat, lessens nervous irritability, and reduces the pulse, when quickened, nearly to its natural standard.

I had injured my health by being too much in the dissecting room, and I discharged a considerable quantity of blood from my stomach, and fever was the consequence. In this condition I went into the country for the benefit of a pure atmosphere; and I there had frequent opportunity of noticing the influence of cold on an irritable pulse, in my own person: before a fire my pulse would be at  $120^{\circ}$ ; but on going into the cold air, it sank in a short time to  $100^{\circ}$ ; and, by a longer continuance in the cold, it became still less frequent. When my pulse was quick and irritable, and my skin was heated, if I used a cold bath in the morning, on that day my pulse was slower, and the superfluous heat was removed; so that the body was much cooler than in the preceding day. or on

the succeeding day, when the bath was not used. Thus, where there is great irritability of the nervous system, and where the heat is sending the blood with accelerated motion through the different channels, cold will prove invigorating, by lessening the first of these affections, and reducing the latter to the natural standard.

The manner, therefore, in which cold relieves inflammation, when locally applied, is by abstracting heat, by lessening the diameters of the vessels, and by diminishing nervous irritability.

*Heat and moisture.*—The next mode of relieving inflammation by local remedies is by the application of heat, with moisture; this appears like contradiction; apparently, opposite causes are used to produce the same effect; and it seems to be blowing hot and cold with the same breath; but it is so. The application of heat alone would be injurious, by increasing action; but, when combined with moisture, it is beneficial, by producing relaxation, opening the cutaneous pores, and giving rise to perspiration; thereby removing congestion, and producing nearly similar effects to those which arise from the application of blisters. The effects of heat and moisture combined are well exemplified by what happens when a person takes a warm bath; for instance, a person whose pulse is at  $75^{\circ}$ , places himself in a bath, the water of which is heated to  $100^{\circ}$ ; his pulse soon rises to  $100^{\circ}$ ; presently he perspires freely, his pulse becomes less frequent, but soft; great relaxation follows, and, if he were not removed, he would faint, so great is the exhaustion that it occasions. Here then is a direct proof of what heat and moisture produce, when applied generally; and when used locally, the effect on the part is precisely the same.

Fomentations are ordered on the same principle, to relax the secreting extremities of the vessels, and produce perspiration of the surrounding parts; by which tension is removed, and pain consequently abated. I do not think that medicated fomentations are preferable to mere warm water, unless the integuments be broken. With respect to poultices, they are used with the same views; to excite relaxation, and to produce secretion; the kind of poultice is of little consequence if the integument be sound.\*

*Local bleeding by leeches.*—The next method of relieving inflammation is, by the application of leeches: by abstracting blood from the vessels of the part, they lessen their diameters, and consequently diminish their distention and force of action; they take away but little blood during the time they remain on the part; but

\* Even when the integument is sound, I believe anodyne fomentations or poultices to be of considerable service in alleviating local irritation; and have known patients experience much benefit from their use, when common poultices have been applied without affording relief. If the iris can be affected by the application of belladonna to the eyebrow, or if preparations of lead are beneficial in inflammation when the surface is not broken, why may not anodynes allay irritation?—T.

considerable quantities will flow from the wounds made by them, if heat and moisture be applied immediately they fall off, as they prevent the formation of coagula, by which the wounds would otherwise become closed.

To some persons, and in some situations, however, the application of leeches is attended with very great inconvenience;\* as, for example, when the testis is inflamed, it is of considerable importance to some persons that bleeding from this part should be concealed; in such a case, to avoid the inconvenience of the application of leeches, and the exposure consequent on the after bleeding, it is better to puncture some of the distended vessels on the scrotum with a lancet, keeping the patient in the erect position; you may in this way get away any quantity of blood you wish; and what is of great consequence you can stop the bleeding when you please, by placing the patient in a recumbent position, and applying some linen, dipped in cold water, over the punctures, which become quickly closed. In deep seated inflammation, blood should also be removed by cupping.

*Treatment.*—I shall now describe the local treatment of chronic inflammation.

In the acute inflammation, the object is to decrease vascular action; but in the chronic we endeavour to strengthen and change it. Thus in long continued discharges, arising from relaxation, we endeavour to restore the vessels to their healthy power of contraction, by employing astringent and stimulating lotions,—as in chronic ophthalmia we apply solutions of alum, of the sulphates of zinc or copper, and of the nitrate of silver, &c.; in chronic affections of the skin, we use lime water and calomel, or the oxy-muriate of mercury, &c. Gonorrhœa, as I have already mentioned, is an excellent example of the difference between acute and chronic inflammation, and of the principles upon which the opposite treatment is founded; at first you diminish action, but afterwards stimulate to promote contraction of the dilated vessels.

When you apply stimulating lotions, you should cover the parts with oil silk to prevent evaporation, by which cold would be produced, and your intention frustrated. The object being to excite heat and action, the prevention of evaporation materially assists; and as the perspiration, as well as the vapour from the lotions, condense on the inner surface of the oil silk, it keeps the parts constantly moist, which is very advantageous, as it enables you to remove the applications without disturbing or injuring the new-formed skin. When this covering is not used, the linen over the

\* In many persons, when leeches are applied, they cause a kind of erysipelatous inflammation, rarely of a dangerous nature, but producing considerable inconvenience and disfigurement. In such cases they afford little or no relief, and, therefore, should never be used.

If applied over parts which contain much loose cellular tissue, as the palpebræ, or the scrotum, an ecchymosis is a frequent consequence: this is a great objection to their being used to the exterior of the palpebræ in persons who are particular about their appearance.—T.



wound soon becomes dry, and adheres to the newly-formed granulations and skin; consequently, when you remove this linen, the granulation and skin are much injured, and in this manner the progress which nature has made in restoration during twenty-four hours, may be defeated in a single minute.

*Counter irritation.*—The next method of treatment is by counter irritation. The mode in which this acts, is by creating a new inflammation near to the part deceased; the surrounding vessels are immediately put in action to assist in the support of this new inflammation, and consequently blood is abstracted from the neighbouring part in which the disease previously existed: thus a blister at the nape of the neck, if early applied, will stop an inflammation in the brain; a blister at the scrobiculus cordis will frequently check inflammation in the stomach; an irritating lotion applied to the scrotum will often cure an inflammation of the testicle. It is curious to observe, that still a similar advantage is derived from counter irritation in parts that have no immediate connexion. In inflammation of the lungs, a blister applied on the chest (parts between which there is no direct communication) will assist in checking the disease; blisters on the forepart of the abdomen are very beneficial in inflammation of the liver, intestines, &c.

Blisters are more frequently used for exciting counter irritation than any other means. Issues and setons are sometimes adopted; they were formerly much employed as counter irritants; but they often produce too much, and also irritative fever, and thus add to the original malady they were intended to subdue. Counter irritants must never disturb the constitution. Sometimes after a blister has been removed, it may be necessary to keep up the irritation and discharge; to accomplish this, the cuticle which has been raised by the blister must be removed, and the exposed surface dressed with the savine ointment.\*

Another mode of producing counter irritation is by rubbing on the part tartarized antimony in combination with oil or lard. This is a very excellent method, and is now generally adopted. You must be careful, however, on what part you apply it, if you intend to excite irritation in a great degree, as it is likely to blemish the skin. I saw a young lady, who had used it on the arm for a chronic affection of the elbow joint; she was much offended with her medical attendant, for recommending its employment, as it had left a scar on the part.†

\* In some persons the employment of cantharides to produce counter irritation, occasions considerable irritation of the urinary organs, amounting, in some cases, to strangury; this more frequently happens, when the cantharides are applied with a view to promote discharge from a raw surface —T.

† A mode of producing counter irritation, very common on the Continent, is by the application of moxa: one end of a roll of cotton (which has been dipped in a solution of nitrate of potash, and dried again) is lighted, the other end is placed to the part on which it is wished to produce irritation, and kept there until the whole is consumed. I have seen this operation performed

*Position.*—The next circumstance to be attended to in the treatment of inflammation is position. Although the human body is not to be considered as an hydraulic machine, yet the fluids are in some measure governed by the laws of gravity. Look at the operation that I spoke of before, for relieving inflammation of the testicle; the vessels of the scrotum are punctured, and if the patient be in an erect position, the blood will flow freely; but put him in the recumbent posture, the stream will immediately cease.

If the hand or fore arm be the seat of inflammation, the limb should be placed on an inclined plane, by which the hand and elbow may be raised higher than the shoulder, as in the cal abscess of the fingers or hand, and in acute inflammation of the elbow joint, &c. It is equally necessary to attend to the position in inflammation of the leg. I will give you an example.—I was sent for to see a gentleman farmer, in the neighbourhood of Rayleigh, in Essex, who for a long time had been subject to a very severe inflammation in both his legs; they were of a very dark red colour, much swollen, and gangrene was threatened in them; the constitutional irritation was great, and his tongue covered with a brown fur: when I saw him, his legs were resting in a tub of cold water, and on his taking them out they smoked. I had him immediately placed on a sofa, and contrived to rest his legs upon one of its ends, so as to raise them much higher than his body: the vessels soon began to unload themselves, and in a short time the redness of the skin was much lessened; I then applied flannels, which had been dipped in tepid water, and afterwards in warm water; this produced a free perspiration, by which the skin became unloaded; the swelling and pain consequently diminished. He gradually recovered, and in six weeks was enabled to ride a considerable distance. It would be absurd to attempt to cure extensive inflammation in a limb, if it were allowed to remain in a depending posture.

*Rest.*—During the cure of inflammation, rest is absolutely necessary; all of you must have observed, that exercise increases the action of the heart and arteries, and would therefore be very injurious in inflammation. When a joint is enflamed, it is one of the grand principles in treatment, and no good can be done without it; it is curious to observe how nature herself endeavours to obtain this state; for where a joint is diseased, the muscles of the limb have in great degree lost their power; thus, if a man has inflammation of the wrist, elbow, or shoulder joints, and you place your hand in his, desiring him to squeeze yours, you find that he cannot do so, or that the attempt is exceedingly feeble. In inflammation of the joints in the lower extremities, the muscles of the part in like manner lose their rigour.

*Indurations.*—Indurations frequently remain after inflammation

several times, but I do not think it at all preferable to the other modes which are in common use.—T.

has entirely ceased; these are removed by the following means, which produce absorption.

*Pressure.*—Pressure has the power of exciting the action of the absorbents in an extraordinary degree, and you may apply it either by the use of rollers, or strips of plaster.\*

*Electricity.*—Electricity too is attended by similar effects, strongly exciting the action of the absorbents.

*Mercury.*—Mercury does the same, and much more decidedly than the other remedies I have mentioned. Thus, when a man dies in our foul wards, in a state of salivation, we find that the alveolar processes and gums, have in part been removed by absorption.†

*Friction.*—Friction has of late years been much employed for the cure of indurated and stiffened joints, consequent on inflammation; it was recommended by the late Mr. Grovesnor, of Oxford. This remedy was his hobby, and, like all other hobbies, it occasionally carried its rider into the mire; for Mr. Grovesnor sometimes recommended friction before inflammation had sufficiently subsided, consequently it produced mischief; in many instances, however, when judiciously employed, the best results are effected. A gentleman, in the neighbourhood of Nottingham, when shooting, received a severe injury to his knee: after the violence of the first inflammatory symptoms was over, there remained considerable swelling, stiffness, and induration; for these he was attended by Mr. Attenborough, an eminent surgeon, of Nottingham; as the gentleman did not rapidly improve, Mr. A. sent him to town, and he remained for a length of time here under my care; still the joint continued in the same state; I advised him to go to Oxford, and consult Mr. Grovesnor. This he did, and as soon as Mr. G. saw him, and found that his limb had been kept quiet, he told him to walk to the bottom of Christ Church meadow, and return to him, which the gentleman really did. Friction was used in this case with the greatest success; for within six

\* When it is necessary to apply pressure to any part of an extremity, it is best to commence from the end, as the fingers or toes, otherwise partial pressure, by preventing a return of the blood by the veins, creates effusion and inflammation, and sometimes mortification.

A sergeant, belonging to an infantry regiment, was shot through the leg at the battle of Waterloo; some considerable hæmorrhage followed, to stop which one of his comrades tied a narrow bandage tight over the openings; he remained several days in the neighbourhood of Waterloo, without having any medical assistance; and although his leg had been excessively painful, and was swelled considerably, he was afraid to remove the bandage for fear of bleeding. When he was brought into the hospital at Brussels, gangrene had commenced, and he was obliged to submit to have the limb amputated.—T.

† In severe cases of iritis, in which lymph has been deposited on the surface of the iris, the influence of mercury, in promoting the action of the absorbents, is distinctly and beautifully shown. I have seen many cases in which the lymph occupied as much as one half of the anterior chamber; yet, after mercurial action had been excited, and kept up for a few days, the lymph had entirely disappeared.—T.



weeks from the time he went to Oxford, he called on me in town, quite recovered, to thank me for my recommendation to Mr. Grovesnor.

Friction accelerates circulation and absorption; and the way in which Mr. Grovesnor recommended it to be done was by applying both hands to the joints, at the same time alternately moving them up and down.

*Case.*—The late Mr. Hey, of Leeds, a man whose mind was free from every paltry prejudice, most eminent in his profession, and ever anxious for its improvement, had a son who met with a serious injury on the ankle joint; after trying all he could to relieve him, without success, he sent him to Mr. Grovesnor; and, under his care, by judicious application of friction, the actions of the joint were completely restored.

In cases of violence done to joints, when the inflammation has been subdued, which it will be in a month or six weeks, friction and motion are very useful: but in chronic diseases of joints, many months of rest will often be required before inflammation has sufficiently subsided to allow of friction and motion being safely used to prevent ankylosis.

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## LECTURE IV.

### ON THE ADHESIVE INFLAMMATION,

FOR a knowledge of this process, we are indebted to that bright luminary of our profession, the late Mr. John Hunter.

Adhesive inflammation is the process by which divided parts become united.

*Effects of inflammation of the blood.*—Inflammation has a disposition to separate the blood into its constituent parts; for when blood is drawn from a healthy person, it separates into serum and red particles only; but in a state of inflammation, if, after it has been drawn in a free stream, it be allowed to remain undisturbed, it separates into serum, red particles, and fibrin. The red particles, with some fibrin, will be collected together at the bottom of the vessel; and the greater part of the fibrin, separated from the red particles, forms a yellow surface on the crassamentum, or what is called the buff of the blood, and the serum will occupy the surrounding space. The coagulation of the blood is slower than usual, and the red particles are precipitated, so that the fibrin, having lost the red particles, contracts with great firmness, and, when separated, it resembles a piece of leather. It has been said, that the adhesive matter is albumen; but it has been proved not to be so. Dr. Bostock, who lectured on chemistry several years at Guy's Hospital, took great pains to investigate its nature, and published on the subject. Mr. Dowler made many experiments

for the same purpose, and found it to be decidedly fibrin. Mr. Hunter called it coagulated lymph: this certainly was not a very appropriate term. I shall call it adhesive matter from its effect in inflammation, and by which fibrin is to be understood.

*On the membranes.*—Some of the exhalent surfaces of the body naturally secrete a watery fluid, and are called serous; while others, separate mucus. The cellular membrane is one of the former, and exhales a fluid somewhat resembling serum: it contains much less albumen. This membrane is prone to the adhesive inflammation. The vessels which usually secrete the fluid just mentioned, pour out fibrin under inflammation, and which, becoming coagulated, produces the hardness that we usually find in inflamed parts.

*On the peritoneum.*—The membrane which doubly covers the intestines (the peritoneum) is a serous surface, often affected by the adhesive inflammation, which occasions the two surfaces of this membrane to be firmly glued together.

*On the pleura.*—But the part of all others which is the most subject to this kind of inflammation is the pleura; and we rarely open a body of the adult without finding on the surfaces of this membrane some unnatural adhesions.

*On the pericardium and dura mater.*—The heart, in like manner, is often glued to the pericardium, so that its cavity is sometimes obliterated. And in the membranes of the brain we frequently meet with partial adhesions between the dura mater and tunica arachnoides.

Thus, then, it will be seen that the serous membranes readily assume the adhesive inflammation, by which they become permanently united to each other, or to the adjacent parts; this is a most beautiful and wise provision of nature; for if the membranes of cavities, such as the pleura and peritoneum, instead of the adhesive, were to produce the suppurative inflammation, effusion and death would be the frequent consequences; for example, matter would be often formed in the cavity of the pleura, and empyema would generally destroy.

*On the urethra.*—The urethra is generally affected by the suppurative inflammation. This is another of nature's benevolent and wise ordinances; had the outlets of our bodies been subject to the ready production of adhesion, they would have become closed and life destroyed. Sometimes, where inflammation of the mucous membrane of the urethra is exceedingly violent, it passes into the adhesive stage, glues the parts together, produces retention of urine, and unless the person were relieved by an operation, the disease would end in the destruction of life. I witnessed the following curious example of this circumstance: a kangaroo was brought to me for dissection, from Exeter Change; its bed of straw had caught fire, and, although it was very soon extinguished, the animal died; and the proprietor, knowing that it had not been

severely burnt, was at a loss to account for its death. Upon examination, the bladder was excessively distended with urine, and it was retained in consequence of the closure of the urethra by the adhesive inflammation; the penis having been injured by the fire, the inflammation that followed was violent, and, being adhesive, closed the urethra. Thus you may perceive that common gonorrhœa would destroy life if the urethra were not so constructed that its membrane is more readily affected by the suppurative than by the adhesive inflammation.

*Trachea.*—When inflammation attacks the air tube, it usually happens that the mucus, which it secretes, becomes purulent; but in very violent inflammation, adhesive matter is effused, and produces the disease which is called croup. If the larynx be the seat of this disease, it frequently destroys life; but when the inflammation is seated in one of the bronchiæ, the adhesive matter is coughed up, in an arborescent form, and the patient recovers.

*Nature of adhesive matter.*—When an incision is made into a part which has been affected by the adhesive inflammation, viz. the cellular membrane, a quantity of serum is found effused around the inflamed part; and in the part itself, a yellow and semi-transparent substance, having the appearance of jelly, though different in its nature. The best opportunity of witnessing the adhesive inflammation, is on the skin, under the irritation of a blister; the blister produces the same effects as those occasioned by the operation for hydrocele. Let a blister be applied for twenty-four hours, till the cuticle be raised; then make an incision into the vesicle, and a quantity of serum will escape: here, your observation generally terminates; but examine the surface, and you will find on it a yellow substance, which will in a greater or less degree exist, according to the length of time the blister has been applied; also on its severity, and the irritability of the skin, but generally under the application of a blister, adhesive matter is effused, as under adhesive inflammation.

*Time required for production of adhesion.*—To those who are anxious to know the time required before the commencement of adhesive inflammation, it may be proper to state, that it is different according to the structure of the part and nature of the constitution. In the cavity of the abdomen, the intestines will be glued together in nineteen hours after the adhesive inflammation has begun. I mention nineteen hours, because I have seen it produced in that time in a case of gun-shot wound. It may be in the recollection of some of you, that a Mr. Blight was shot by a man of the name of Patch, in the neighbourhood of Deptford; the ball traversed the abdomen: I was called to this case, and Mr. Blight died nineteen hours after he had received the shot. I had an opportunity of seeing what I have just mentioned; the intestines were glued to each other, and to the peritoneum; the surface of which had much adhesive matter on it.



On other wounds the process of adhesion takes place rapidly; for if a piece of lint be applied to a recent wound, in twelve hours it will be glued firmly to the surface: in a dog the adhesive process commences in six hours.

Adhesive matter, when effused in a thin membrane, coagulates in a net-work, assuming the character of cellular membrane.

*Adhesive matter becomes organized.*—When adhesive matter has been formed, blood-vessels soon enter it, and within a short time it becomes organized; the vasa vasorum are elongated, by the force of circulation, and enter the newly formed substance, sending out minute ramifications. On cutting into adhesive matter within twenty-four hours after it has been deposited, small bloody spots may be seen, marking the future situation of the vessels which nourish it; but it is not till ten days after it has been formed that any considerable portion of adhesive matter becomes entirely organized; for if injected, you will not completely succeed through every part of the newly formed substance until ten days after the injury, and not even so soon in certain structures.\*

When vessels elongate, they have not the character of arteries in general, they take a serpentine and tortuous course.

It has been thought that the new vessels originated in the effused substance; but they are formed by the elongation of the vasa vasorum of the surrounding arteries, which become dilated, lengthened, and serpentine, and the degree of vascularity will be in proportion to that of the part subjected to the adhesive process. In tendons, for instance, it will be much less than in muscles.

*Use of the adhesive inflammation.*—This process is of the greatest possible importance in surgery. It ought, therefore, to command much of your attention; and it will be unfortunate for you if you do not understand it. Without this process no operation could be attended with success; its absence, even after bleeding, would destroy life. Bear this principle in mind, endeavour to effect union by adhesion. You have seen, during this present winter, a man admitted into Guy's Hospital with a compound fracture, which was rendered simple by applying lint dipped in blood, and in a fortnight all danger from the accident was dissipated.

*In compound fracture.*—Suppose you were called to a compound fracture, what would you do? Endeavour, certainly, by bringing the parts together, to make it simple fracture. Within these few days you have had an opportunity of witnessing the fatal consequences of hæmorrhage in a case of compound fracture; but if the

\* Mr. Hunter relates a case in which the adhesive matter, effused in inflammation, had become organized in twenty-nine hours. He operated on a man for strangulated hernia, and the patient died twenty-nine hours after the operation. On examination of the body, he found some adhesive matter (which did not exist at the time the operation was performed) deposited on the portion of intestine which had been strangulated; very fine injection of different colours was thrown into the arteries and veins of the gut, which also filled the new-formed vessels in the adhesive matter, rendering them perfectly distinct.

adhesive process had taken place, hæmorrhage would have been prevented, constitutional irritation lessened, and recovery rendered almost sure.

*In operations.*—It is the same in formidable operations. The Cæsarean section, which consists in making an incision in the course of the linea alba, for the purpose of extracting a fœtus from the wound, is not dangerous, if the adhesive process takes place. Its advantage may be exemplified by the operation for cataract: in this operation a wound is made in the eye, more than half of the cornea is cut, the adhesive process begins within twelve hours, and in twenty-four the edges of the wound are consolidated. Suppose, on the contrary, they do not adhere, violent inflammation supervenes, and the result is destruction to the eye of the patient by suppuration; the success of the operation depends then on the adhesive process. In a person who has been in ill health, the inflammation may be too weak, and in another case it might be too strong; suppuration would be the consequence in both instances: thus the same effect results, though produced by very different causes. Again, in the operation for slaughtered hernia, an opening is made into the hernial sac, which communicates with the cavity of the abdomen; and if the parts are not afterwards united by the adhesive process, the patient dies.

In the operation for aneurism, it is the adhesive inflammation which saves life; a ligature is applied to the artery, a coagulum of blood forms, the adhesive process commences, fibrin is poured out, and the internal coats of the artery are glued together; but for this circumstance, when the ligature separates, hæmorrhage will certainly ensue.

In the operation for the radical cure of hydrocele, we have an excellent opportunity of witnessing the effects of adhesive inflammation. After the water has been evacuated, a stimulating injection being thrown into the cavity, excites upon its sides an irritation; inflammation is set up, adhesive matter is thrown out, the internal surface of the cavity generally becomes permanently united, and thus a radical cure is effected. If an incision be required to be made into the tunica vaginalis, whilst it is suffering from the adhesive inflammation, its cavity is found filled with a substance which has the appearance of jelly.

The treatment of a stump after amputation will best exemplify this subject. In amputating a limb, your first object is to preserve sufficient integuments to cover the ends of the bone; it should be integument and not muscles, which cover the end of the bone; for if muscles are brought with the integument over the bone, they will contract, and retraction of the skin covering the stump will be the result. When the limb has been removed, you will apply ligatures to the bleeding vessels; now I would not advise you to tie every small vessel; ligatures on the principal vessels are quite sufficient, and the fewer you apply the better; for though it is very desirable to prevent disturbance of the limb on account of hæmor-

rhage, yet by waiting a short time after the operation, the bleeding from the smaller arteries will generally stop.\*

The ligatures themselves should be small, and consist of fine silk; for nothing is worse in operation than the application of coarse ligatures, excepting perhaps in cases of ossification of the arteries, when it would be justifiable; with this exception only, it is the worst possible surgery to apply thick ligatures to arteries.

Now there are two reasons why small ligatures are preferable: 1st, because they are less liable to escape from the artery; 2d, they divide the internal coats of the arteries more effectually; when you use a very fine ligature, the internal coats will be divided, and the external will remain entire. My friend Dr. Jones published an excellent work on the means by which arteries unite in cases in which they have been divided, or ligatures applied upon them; and he first stated the fact of the internal coats of the artery being divided by the application of fine ligatures; and that they consequently would more readily adhere from their surfaces having been broken. Thick ligatures prevent the wounds from healing so rapidly as thin, and they are upon that account objectionable. After the vessels have been secured, the sponge should be applied, and all coagula of blood be removed, as this is very essential to the union of the part; blood is not the means but the prevention of union in such cases; for unless it be removed, the adhesive inflammation will not produce its desired effect. There is one instance in which blood favours the process of adhesion, and that is in the application of a ligature on a blood-vessel; for a clot of blood forms in the artery, and is afterwards glued to its interior by the adhesive inflammation: with this exception, the opinion of blood producing the process of adhesion, is to be banished from your minds, for there are two modes by which union is effected; viz. by adhesion and by granulation; therefore, remove all clots of blood, which will only act as extraneous bodies, and keep up irritation. You are to cut off one end of the ligature close to the

\* During an operation, especially in winter, the patient becomes chilled, or if a considerable quantity of blood has been lost, he becomes faint. In either case the blood will not flow from vessels, which may afford a very free hæmorrhage, when the patient gets warm in bed, or reaction takes place. Independent of the mischief which must result from opening an extensive wound to take up these vessels, at a time that the adhesive process is probably going on, the patient's life is often endangered by the after bleeding.

The plan I usually adopt is as follows: after the larger vessels have been secured by ligatures, I bring the edges of the wound together by one or two strips of plaster, and then have the patient put to bed; and when the pulse indicates that the heart and arteries are again acting with their proper vigour, if there be any fresh hæmorrhage, the vessels are secured; the part is cleansed from coagula, and the dressing is completed.

This practise is, I believe, generally pursued in the army, and also by many hospital surgeons; and is particularly applicable in the after treatment of those who have undergone operations for the removal of diseased mamma, or for the excision of a testicle; in the latter case, there is most frequently a secondary hæmorrhage, if the wound is closed immediately after the operation.—T.



vessel, and let the other hang from the wound: it has been recommended to remove both ends of the ligature close to the vessel; this plan has, however, been already abandoned. It was, I have understood, determined by John Hunter, in the first operation he performed for aneurism on the trunk of the artery above the tumour; for in that instance he cut the ligature close to the knots, and copious suppuration occurred when it separated. Ligatures can only be removed from vessels by suppuration or absorption (in the latter case they must be first dissolved, and then removed by the absorbents); and conceiving that if a ligature, composed of a substance easily soluble, when applied to a vessel, and cut close to the knot, it might be dissolved and then absorbed, I applied a catgut ligature to the femoral artery of an old man upon whom I operated for popliteal aneurism, and cut it close to the vessel; this case succeeded, for adhesion followed, and suppuration did not ensue.

Although successful here, I have tried it in several cases since, and have not been able in any to prevent suppuration. I applied a silk ligature to the carotid of a dog on one side, and a catgut to the carotid of the opposite side. Upon killing the dog some days afterwards, I found the second ligature (catgut) buried in a cyst, and that the first had ulcerated the artery, and advanced to the side of the larynx by a process of ulceration. Experiment and observation show that it is the best plan to cut one end of the ligature off, and to leave the other hanging from the wound, to be removed when the ulcerative progress is completed, which is from ten to fourteen days; Dr. Veitch, I believe, first advised the removal of half the ligature.

After amputation, having disposed your ligatures in a line with each other, and leaving them to hang out at the most depending part of the wound, you will, if the limb be removed above the elbow or knee, apply a roller to prevent retraction and separation of the muscles and extensive suppuration. I have seldom succeeded, to my satisfaction, with my stumps above the knee without a roller; it is better to apply a roller in such cases, for the muscles will then be glued together, and form one consolidated mass. Having applied a roller, and brought the integuments together, I merely put three strips of adhesive plaster over the wound, and two round the stump, to keep the ends of the plaster in their place. It is curious to see the difference between the mode of dressing stumps now, and that adopted a few years ago. The old practice was, after the adhesive plaster had been applied, to put some lint, then plaster again, after that tow, and lastly, over the whole, a cap of flannel. If a surgeon were to do this now, he would be laughed out of the operating theatre; and very deservedly, because he would prevent the success of the adhesive process by undue heat in the limb.

All that is necessary to do is, to use three strips of plaster over the wound, and one circular piece; if the weather be hot, to apply

spirit of wine and water; and if cool, to keep the limb quiet. The object is, to prevent the inflammation passing beyond the adhesive stage; for then suppuration must be the result.

The last circumstance necessary to mention is, the impropriety of dressing the stump too early; a surgeon, anxious to see if union has been produced, removes the plasters from the wound in two or three days: he who does this, entirely overlooks the object in view, and must be shocked, when he observes that the early removal of the plasters has destroyed all that nature had done. You ought, in four days after the operation, to remove one strip of plaster, for the purpose of letting out any matter which might have collected. In six or eight days after the operation, it will be proper to dress the stump, and then to re-apply a strip of plaster before you remove the whole of the first dressing.

This treatment, which is applicable to stumps, is proper also for common wounds; so that these are the principles by which you are to be directed.

The adhesive process is useful in the formation of cysts. Balls encysted, have been known to remain in the body for many years. Morgagni, if I rightly recollect, mentions a case, in which he found a ball lodged in the cyst in the lungs. You see by this preparation how complete is the cyst, and being little irritable, the ball remains in a quiescent state for the rest of life. If the ball be not encysted, it travels, by absorption of the parts through which it passes.

Another very important use of adhesive inflammation is, that of its dividing cavities into distinct parts, by which means it fixes a boundary to the suppurative process; thus the cavity of the abdomen becomes divided into two, by the effusion of adhesive matter on the surface of the colon, by which it is glued to the peritoneum. In abscesses a cyst is formed by the adhesive process round the matter, and prevents its escape into the surrounding cellular tissue.

The advantage of adhesive inflammation is admirably shown in wounds in the joints. So soon as the knee joint is opened the synovia escapes, the person feels faint, looks pale, and the constitution appears to have received a severe shock. The wound endangers the loss of the limb and of the life of the patient, as the surgeon treats it judiciously or erroneously. If a poultice be applied to such a wound, or fomentations be used, a suppurative inflammation will follow on the synovial surface; the cartilages become absorbed, and the bones ulcerated; a profuse discharge ensues; the constitution becomes extremely irritated; chills, succeeded by burning heat, and profuse perspiration, frequently follow each other; and a person, just previously in the finest health, is precipitated into a state of extreme emaciation. Sometimes the joint, after weeks or even months have elapsed, gradually heals by granulation, with entire loss of motion, or a great diminution of it.

If, on the contrary, the surgeon brings the edges of the wound immediately together, and takes advantage of the adhesive inflammation to close the wound, the patient escapes from local or constitutional irritation, and in a fortnight is free from danger, and has scarcely suffered from the injury. He effects this object by bringing the edges of the wound together, by a fine suture, a plan to which some surgeons object; but when the wound is direct into the joint, it secures best the safety of the patient, as the secretion of synovia has a constant tendency to prevent adhesion, and to separate the plaster. Let the suture penetrate the skin only, avoiding the ligament; apply a piece of lint over it wetted in the patient's blood, and strips of adhesive plaster over the lint. A roller is to be gently bound round the knee, and to be kept constantly wet with the liq. plumb. acet. c̄ spir. vini; and a splint is to be placed behind the joint to preserve perfect rest.

In cases in which the constitution is destitute of vigour, the adhesive inflammation is sometimes so deficient, that immense abscesses are formed from their not being bounded by adhesion; and I recollect having seen in a poor hypochondriac the back nearly covered by an abscess to which adhesion had not formed bounds.

In hare-lip it is by the adhesive inflammation the wound becomes united, and the horrible deformity is removed.

The effusion of adhesive matter, by unloading the vessels of the part, has the effect of reducing the inflammation; so that the process generally terminates as soon as this effect is produced.

The great facility with which many of the soft parts unite by adhesion, has led to the application of this principle for the reparation or restoration of some portions which have been destroyed by disease, or designedly mutilated.

In the East Indies, where it is the practice of many of the chiefs to cut off the noses of their prisoners, an operation is frequently, and in most cases, successfully performed, to make a new nose. Mr. Carpue has performed some successful operations of the same nature in this country, and the mode of conducting them has been well described by him.

Mr. Lynn has made a new under lip, by bringing the skin from beneath the chin.

I have made a new portion of urethra from the skin of the scrotum, and Mr. Earle has performed a similar operation with success.

Occasionally some small portions of the soft parts, which had been completely separated from the body, have again united: many curious cases are on record; but I shall speak more at length on this subject in the Lecture on Wounds.



## LECTURE V.

## ON SUPPURATION.

*Definition.*—SUPPURATION is the formation of purulent matter from the orifices of the blood-vessels; and the fluid so produced is called pus.

Purulent matter is formed either from the exhalent vessels of natural surfaces, when inflamed, or in cavities formed in the body by an ulcerative or absorbent process, as in abscesses, or from granulating surfaces.

*Constitutional symptoms of suppuration.*—Rigors, succeeded by heat, attended with a quick and hard pulse, and with other symptoms of constitutional irritation, generally precede the formation of matter in acute abscesses.

When matter is formed upon the natural surfaces of the body, which are connected with organs of vital importance, much irritation and disturbance attend it; but when matter is produced upon wounded surfaces not important to life, or upon parts of little vital importance, then it is often formed without an irritative fever preceding it.

Whilst the rigor occurs, the blood is collected in the large vessels in the vicinity of the heart, and in the heart itself. Torpor of the nervous system, coldness of the surface, and diminution of the powers of volition occur, and irregular actions of the muscles are produced. But the congestion of blood in the heart soon excites it to additional action, and the blood is propelled from it through the vessels with unnatural force. The heat of the body is then restored, and nature directs the blood to the part in which it is particularly required; and thus does the constitution assist in the production of suppuration. These excessive exertions lead to relaxation and debility, and the vessels pour out from their extremities upon the surface of the body, the watery parts of the blood in the form of perspiration; but when pus is easily produced, as upon some mucous surfaces, and upon the surfaces of wounds, such constitutional efforts are often unobserved.

*Local symptoms of suppuration.*—The local symptoms which attend this process are, that the part becomes more painful, that the kind of pain is changed from an equal and dull sensation to an acute and pulsatory pain, accompanied by throbbing of the vessels, so that the patient can reckon his pulse in the inflamed part. The swelling rises at one part, so as to form a portion of a smaller circle, or to be, in the surgical expression, pointed; the redness is increased, becoming more of the arterial kind, so that there is a blush upon the surface. A fluctuation may be perceived by feeling the part with two fingers at a slight distance from each other. The cuticle separates, a vesication destroying its attachment, and

the cutis and cellular membrane become thin, so that the matter gradually approaches the skin.

Sometimes the external surface of the skin ulcerates in a number of spots to meet the ulceration from the interior, but generally the process is entirely from within. At length an opening of an irregular kind is produced, and the matter gradually escapes, as the aperture enlarges.

*Time required for the formation of pus.*—The time required for the completion of this process depends upon the constitution of the patient, and the nature of the parts, in which, or under which, the matter is formed. If seated under a tendinous structure, abscesses are very slow in proceeding to the skin, on account of the difficulty which attends the ulcerative process in tendons. In a healthy constitution from seven to fourteen days will be required to form and to break an abscess in the breast of a female, who is otherwise healthy, although it is sometimes a much longer time.

*Parts prone to suppuration.*—Some parts of the body are very prone to the suppurative inflammation, so that in them suppuration seems to precede the adhesive process: a slight degree of inflammation, producing suppuration, or a higher degree of it, adhesion. Mr. Hunter first observed this circumstance.

*The Urethra.*—The urethra, when it has irritation produced in it from the introduction of a bougie, frequently suppurates, but very rarely adheres.

*Trachea.*—The trachea, if it inflames, generally suppurates, although the adhesive inflammation does sometimes occur in it.

*Nasal membrane and lachrymal canal.*—The lining membrane of the nose, if it inflames, easily suppurates, the mucus becomes first of a yellow colour, and then pus is secreted. The lachrymal sac and duct very generally suppurate, under inflammation; and hence the disease is called fistula lachrymalis, from the suppuration proceeding to ulceration, and the matter being discharged through the fore part of the cheek.

*The antrum.*—The antrum maxillare and the frontal sinuses also readily suppurate under inflammation.

*Joints.*—When joints inflame, the internal surface of the ligament which secretes the synovia is more disposed to the suppurative than to the adhesive inflammation, on account of its mucous structure; and there is considerable difficulty in preventing suppuration in these cavities when they have been opened by wounds. The skin, the cellular tissue, and the external part of the ligament will adhere; but the synovial surface, which secretes a mucilaginous fluid, does so with difficulty. The surgeon is therefore obliged to depend upon the production of adhesion in the external parts. The same observations apply to wounds of the cæcæ, which are very apt to suppurate, and the matter to take the course of the tendon to the wrist, and to produce by its confinement the most violent symptoms of irritation.

In making openings into joints to remove extraneous bodies, it is desirable to draw the skin aside before the aperture is made; and, when made, it should be suffered to return to its natural situation, and it forms a valve to cover the opening: in this way I first saw Mr. Cline perform the operation, and in the same manner I have since done it myself.

The vessels of mucous surfaces being large, allow of the passage of the globules of pus more readily than such globules could pass through the vessels of serous surfaces, which naturally secrete the more watery parts of the blood. It does not in the least diminish our admiration of the law, that the interior parts of the body shall adhere and the outlets suppurate, because we know that it is founded upon a difference in their structure.

The evil which arises from a suppurative process, upon surfaces naturally serous, may be shown in the following examples, in which the suppuration arose on serous surfaces from an unhealthy state of the constitution.

*Cases.*—I amputated the leg of a man, in Guy's for a very unhealthy ulcer. In a few days after the operation he became delirious, had much pain in bending his limbs, and had a low fever, which might have been mistaken for typhus, although it was only a fever from irritation; in the second week from the amputation he died. Upon examination of his stump, I found matter had formed above the ligature, both in the artery and vein; it had not mixed with the blood, but its formation and confinement produced the violent symptoms or irritation which followed. The vessels were also inflamed above the part in which suppuration had happened, which was probably the cause of fever: the occurrence is but rare, and was probably the result of a very irritable constitution. Also, in a case in which I tied the saphena major vein, matter formed in it, and the most violent constitutional irritation was produced, with delirium; and although the patient did not die from this cause, she was in the most imminent danger.

The formation of matter in the pleura, pericardium, and peritoneum, succeeding the adhesive inflammation, shows the wise provision of that law which renders them prone to the adhesive process.

*Formation of pus.*—Pus is not, as it was formerly supposed to be, a fluid formed by the dissolution of solids, but is produced directly from the blood, changed somewhat in its nature from the action of the blood-vessels. That it is not the product of the solids of the part upon which it is produced, is seen in the application of a blister to a surface. For instance, let a blister be applied upon the chest, and the cuticle raised, the serum which is produced, and the fibrin which is poured out, be removed in a few hours; inflammation arises upon that surface, and pus is formed on it from the extremities of the exposed vessels. Some little change may take place after the effusion, but the fluid is directly formed from the open extremities of the vessels. On all serous surfaces, as the pleura, pericardium, and peritoneum, there is no



loss of substance in the largest productions of matter; but, on the contrary, great addition is made to these membranes. Is the urethra abraded in gonorrhœa, or the trachea in its suppuration?

Pus seems to possess no chemical quality by which it can act upon dead, much less can we conceive its power of dissolving living solids. Bones will remain for months and even years in pus without solution, and tendons continue in it for several weeks, and at last separate by sloughing. Experiments were made in this Hospital, whilst I was apprentice here, to ascertain if portions of meat would be dissolved in pus; but no diminution of their weight was found until the process of putrefaction commenced; it follows then, as milk, bile, saliva, or tears, are produced from the blood by the action of the blood-vessels, so is pus but an altered state of the blood, produced by the extremities of the secreting vessels upon the natural surface, or upon the granulations of an ulcer.

Inflammation precedes the formation of matter: in healthy persons it is active; in the debilitated and scrofulous it is often very slight, and the pus which is produced is generally less perfect. Sometimes even there is such a change of action that the products entirely differ, being serous and curd-like, or even chalky, in scrofulous abscesses.

A cyst is formed in an abscess to surround and confine the matter; but it is to be understood, that this cyst is not a cell in which the matter is contained, but the cellular tissue has in its interstices adhesive matter effused, which prevents the pus from passing into its cells in a healthy abscess.

*Nature of pus.*—Pus is a yellow fluid; if poured into water it sinks in it, and is consequently of greater specific gravity than water; on the other hand, mucous generally swims in water. It appears to contain the constituent parts of the blood; examined under the microscope, it possesses globules, which differ from those of the blood in colour, but greatly resemble them in their general appearance. These globules float in a fluid which resembles serum in its coagulating by heat, as is easily seen by exposing pus in a spoon over the flame of a candle. Pus also contains abundance of fibrin: if water be poured upon pus until the solid part, which remains at the bottom of the vessel, be entirely deprived of its serum and globules, numerous portions of fibrin are found remaining; although not exactly the same size, yet they have a great uniformity of appearance. Thus pus is composed of serum, fibrin, and globules; and if I were to hazard a theory upon this subject, I should say that pus was composed of the constituents parts of the blood, slightly changed in their character by inflammation.

It does not appear to be prone to a putrefactive state; and we therefore find, in its healthy state, it has not a putrefactive smell; but changes in the constitution will sometimes render it excessively putrid.

*Case.*—A butcher's servant fell from a window upon one of the hooks of the shambles, which caught him, and suspended him by the ham until he was extricated; he was brought into St. Thomas's

Hospital, in which he died of tetanus ten days after the accident. An abscess appeared in his ham two days before his death; and when it was opened, the matter was found insufferably offensive.

Matter will be also rendered offensive by local circumstances, as by diseased bone. For example, in diseases of the bones of the nose, the smell is more offensive to my olfactory nerves than any thing I know in nature.

*Nature of fætid pus.*—Matter thus changed or altered, by the presence of blood or of sloughs, was found by Dr. Crawford (formerly physician of this Hospital, whom I recollect making many experiments upon the subject) to contain sulphuretted hydrogen gas.

*Secretion of pus suspended or changed.*—A state of fever, or an inflammatory excitement in the part, will suspend the secretion of matter. We see, in fevers, irritable sores becoming dry, and often almost appear to heal, whilst that state of constitution continues; but becoming again irritable and secreting largely when the fever subsides.

When inflammation occurs upon a leg which has been long the subject of ulcer, the sore ceases to secrete whilst the surrounding skin is red, but matter is reproduced so soon as the inflammation ceases. The character also of the matter becomes changed by local inflammation. Thus we see serum substituted for pus, or a red fluid, composed of serum and red particles, produced whilst inflammation exists in the vicinity of a sore.

The fluid last described often irritates the surrounding skin and produces excoriation; but pus, when formed in its usual manner, is incapable of producing irritation on the surrounding parts, so that we see the skin for days, and even weeks, covered with the matter produced in compound fracture, yet it remains healthy; but let there be fever, or the irritation of an exfoliating bone be present, and the skin soon becomes inflamed from the different quality of the fluid produced.

That pus is formed by the action of vessels is well evinced by the changes which it undergoes in specific inflammations; for then not only is pus produced, but matter possessing poisonous qualities. The matter of gonorrhœa is applied to the urethra, and a poisonous pus is secreted; and it will proceed for weeks, or even months, and be still capable of conveying a similar infection. Our sailors have thus been the means of conveying gonorrhœa to Otaheite, and to many others of the South Sea islands. The matter of chancre produces a sore capable of affecting the glands on the groin, the skin, the periosteum, and the bones.

The fluid of small pox will occasion, by its insertion in the skin, poisonous matter, capable of exciting fever and covering the body with pustules, all containing similar matter to that which originally produced the inflammation at the inoculated parts: a poison not extinguished by death; for a friend of mine inoculated

his daughter from a pustule of a subject dead from small pox, and she had the disease not in a severe form.\*

*Utility of suppuration.*—It is obvious, that a process like that of suppuration, and which is so frequent an effect of inflammation, must be instituted for beneficial purposes; and the uses which it serves are as follow:—Upon the surface of wounds, the principal advantage derived from its presence, is, that it keeps the granulations moist, and thus enables the vessels to elongate, and to form additions to the granulations, until the cavity is filled by them; without the production of this fluid, the surface of wounds could never heal, because the granulations would be destroyed.

*In expelling exrtaneous bodies.*—The second use of matter is seen in abscesses, in which it is the means of exciting absorption, and thus of producing an opening, by which the cause of irritation may be removed; and it afterwards covers the rising granulations until they reach the surface of the skin.

The coagulable matter, which the pus contains, will lead to the healing of a sore without any adventitious aid. Thus we see, in other animals, sores encrusted with the solid matter of pus left by evaporation: under this is fluid pus contained: and when the incrustation is removed, healthy granulations appear. In sores obstinately resisting different applications, I have seen them thus encrusted when left without applications of any kind, and heal gradually without further attention.

*Caution in stopping long-continued suppuration.*—When sores have long existed, some caution is necessary in healing them; nature appears to produce a quantity of blood equal to the discharge which they have supported, and to continue to do so after it has ceased. Inflammation of the lungs and apoplectic seizures will sometimes follow their sudden cicatrization. This may be prevented by great attention to the secretions, by giving frequently calomel at night, and an aperient in the morning; or by occasionally taking away blood, when the above symptoms intervene. The surgeons of former times made issues, or setons, with the same view; but they are now very much discontinued, because by such attention as I have advised their use is superseded. But still it cannot be denied, that a sore will sometimes relieve symptoms of diseased lungs, and even of determination to the brain, independent of any direct counter irritation upon the affected part.

*Case.*—Mr. Wilson, formerly lecturer on anatomy in Windmill Street, informed me, when he was a young man, that he had hæmoptoe and other symptoms of pulmonary disease; that an ulcer formed upon his arm, by which the symptoms were relieved; that he was anxious to heal the sore, and the symptoms returned upon its cicatrization; that the discharge was reproduced, and the pulmonary symptoms were again relieved.

\* In the Lecture on Poisons, a very curious case will be given of a new disease, produced by the translation of a poison from the horse to man.



The suppression of discharges from the ear is attended with great danger of producing matter on the brain.

*Cases.*—Dr. Meyer and myself attended, in Austin Friars, a gentleman who died with hemiplegia, and apoplectic symptoms, from the sudden suppression of matter in the ear. I opened this gentleman, and found matter on the cerebellum opposite the labyrinth of the ear.

Dr. Babington and myself attended a gentleman in Cheapside, in whom I also found matter upon the surface of the brain, from an arrest of secretion of matter from his ear. We also attended together, in St. Paul's Churchyard, a similar case, in which matter was found between the dura mater and surface of the brain.

Dr. Cholmely examined a woman in Guy's Hospital, who died from a similar disease. I can call to mind eight cases of inflammation of the brain, produced by suppression of suppuration of the ear.\*

With respect to the treatment of suppuration, it consists principally in the application of fomentations and poultices; but we shall treat of this subject more particularly when we describe abscesses.

## LECTURE VI.

### ON ULCERATION.

*Definition.*—**ULCERATION** is the absorption of any constituent part of the body.

*Effects of inflammation on the blood-vessels.*—We have already endeavoured to explain to you, that under the action of the vessels which accompanies inflammation, an increased deposit follows from the arteries; also that this deposition depends on the stage of the inflammation, and the texture of the part in which it is seated; thus the inflammation is either adhesive or suppurative; and it ends in the one state in the immediate production of adhesion, and in the other in the effusion of a quantity of purulent matter from the extremities of the vessels.

*Effects on the absorbents.*—But the influence of inflammation is not confined to the arteries; it has also an effect on the absorbent

\* It is curious for how long a period these chronic suppurations will continue. The following is an extract of a letter which I received from a village in Carmarthenshire. An attack of scarlet fever, at ten years of age, "left me extremely deaf in my left ear, and with a discharge of matter from it, which has continued ever since; I am now thirty-seven years of age. In the course of the time that has elapsed, I recollect the discharge having been more than usual about four or six times, which continued about a day, and was always attended with a dead aching pain in my head," &c. &c.

vessels, which are thrown into a state of inordinate action, whenever any considerable quantity of blood is determined upon them.

There is a natural balance between the action of the arteries, and of the absorbent vessels, in a state of health, and at the adult period of life, the portion of matter deposited by the arteries, and that taken into the system by the absorbent vessels, are as nearly as possible balanced. In infancy a greater quantity is poured out by the arteries than the absorbents remove; but in age, a smaller quantity is deposited than absorption is taking away: thus the balance is destroyed in a different manner, at different periods of life; but when a considerable and unnatural absorption takes place of some part of the body; that absorption is denominated ulceration.

It was formerly thought, that it was necessary to the ulcerative process that matter should be formed; but this opinion is not true, for ulceration often occurs without its being accompanied by any purulent secretion. The formation of matter, therefore, is not necessary to the process of ulceration.

*Causes of ulceration.*—The great cause of ulceration is inflammation united with pressure. If the inflammation be considerable, and the pressure but slight, ulceration will be produced; and if the pressure be very considerable, and the inflammation but slight, still there will be ulceration.

*Pressure.*—As a proof, both that pressure is the cause of ulceration, and that ulceration is not necessarily accompanied with the formation of matter, I will give you an example in aneurism. Here is a specimen on the table of a large aneurism of the aorta just above the heart, in which you may pass your hand into the opening produced by the ulceration of part of the ribs and sternum; those parts having been absorbed by the pressure of the aneurismal sac producing an increased action of the absorbent vessels. Here the pressure is exceedingly great; but the degree of inflammation is very slight. In the same manner we see an aneurism of the aorta in the fore part of the spine, producing absorption of the vertebræ by the pressure of the aneurismal bag, though no matter is effused; the ulceration being produced by pressure, accompanied with slight inflammation, but not by any secretion of matter.

From these facts we are led to conclude, that the formation of pus is not necessary to the ulcerative process, but that it is produced on surfaces of the body where it is necessary for the protection of sores, by covering the granulations.

*Symptoms of ulceration.*—In acute ulceration the pain is severe, and the irritative fever considerable; but in the chronic the pain is less, and the fever is of the slow or hectic kind. If you ask the patient, he will tell you the pain is of a gnawing kind, as if there were insects feeding on the part.

With respect to the appearance of the ulcerated part, it looks as if it were worm-eaten; the surface is rough and very irregular.

*Extent of ulceration.*—Sometimes a very considerable portion of

the body is removed by ulceration. Here is an example, on the table, of an ulcerated tibia. See to what an extent ulceration has removed not only the cancellated structure of the bone, but the shell in which that structure is contained. Here is another example in which a great part of the tibia has been removed; the ulceration has extended six or seven inches, so that little more than the fibula remains; such is the power of the absorbent vessels of feeding upon the body and upon themselves.

*Its rapid extension.*—The ulcerative process is sometimes extremely rapid in its progress; as much of the body will be destroyed in a few hours, as it will require weeks and months to repair.

In proportion to the extent of surface destroyed will be the difficulty with which that surface is closed. Something will depend also on the form of the ulceration, and the kind of surface exposed; but the general rule is, that the difficulty of the restorative process is proportional to the extent of surface destroyed.

*Laws of ulceration.*—It is a curious law with respect to ulceration, that it has a tendency to the nearest external surface. This is a law which is attended with the most salutary effects; for, if it were otherwise, the body would very frequently be destroyed by the ulcerative process. In consequence of this tendency, matter formed at a depth in the body, finds its way through the integuments, instead of proceeding through more important parts. Many examples may be given of this law. One of the most remarkable is this: Matter forms not unfrequently behind the sternum, close to the pleura and pericardium, which membranes are extremely thin. From the proximity of these membranes it might be expected, that the matter would generally open into the pleura, and, by discharging itself into the cavity of the chest, destroy life. Instead of this result, however, the pleura undergoes no other alteration than that of becoming thickened, and while it is acquiring this addition of substance, the process of absorption is going on in the inner part of the sternum, an aperture is formed through it, and the matter makes its way through the bone and integuments, rather than through the pleura and pericardium. The same circumstance occurs to the peritoneum. If matter be formed on the abdominal muscles, the peritoneum is very rarely absorbed to admit the matter into the cavity of the abdomen; but the matter makes its way through the integuments, and finds an outlet on the surface of the body.

So in an abscess of the liver, the matter is discharged, not through the skin, which is a more remote surface, but into the cavity of the stomach or intestines, which may be considered as the nearest outlets, from which it is thrown up by vomiting, or discharged with the fæces.

These effects are produced in the following manner: the surface of the abscess becoming united with a portion of intestine or stomach by the adhesive process, the ulcerative action commences; by which a communication is formed between these surfaces, and



the matter is discharged in the manner before mentioned, without danger, or with less danger to life.

The same thing happens in absorption of the bones. Thus, in ulceration of the tibia, the matter breaks through the skin; on that surface which is only covered by skin and periosteum. This is a law in some degree depending on the greater irritability of those parts which are nearest the surface of the body. The most external surfaces of the body are more irritable, and more subject to vicissitudes of action from corresponding changes of temperature than other parts of the body, and they give way to ulceration more readily than those which are more deeply seated, and possess more equality of circulation, and of temperature. Another reason is, that the adhesive process glueing the more internal parts to each other, they become united, and in this way form a considerable solid; but the more external surfaces have no such support. An instance of this is found in the adhesion of the pleura to a lung, so as to form one structure. It may be considered, then as a law of the animal economy, that the ulcerative process has a disposition towards the nearest external surface of the body.

*New parts prone to ulceration.*—Those parts of the body which are newly formed, are more liable to be absorbed than those which have long existed. A part covered by a cicatrix proceeds rapidly to ulceration, because it is more weakly constituted than those which have existed longer. The irritability of a part is proportional to its weakness; and those which are weak and irritable, fall most readily into the ulcerative process.

*Examples.*—To take a familiar illustration; when a child labours under symptoms of constitutional derangement in dentition, you cut its gums; you do so, not for the purpose of making an immediate passage for the tooth, but because, when the gum by the adhesive process heals, a cicatrix is produced by this little operation, which is very readily absorbed; and the result is, that when the tooth rises, the child cuts it with much less pain and irritation, than it would otherwise have done.

If a man have inflammation in his leg, and this is seated near a place where ulceration previously existed, the scar produced by the old ulcer gives way much more readily than the original skin. I have observed, that if a patient under gonorrhœa has had an abscess in the urethra, which will now and then happen in consequence of suppuration of the lacunæ, or if from that cause he has had an abscess in the scrotum, or on the side of the penis, a second gonorrhœa will be sure to be followed by a similar abscess. Proceed with as much care as you may, guard against inflammation with all possible caution, and yet if abscess existed in the first gonorrhœa, it will generally return in the same part in a succeeding disease of the same kind.

Some of the most remarkable instances of the readiness with which the process of absorption attacks newly-formed parts, may be seen in Lord Anson's Voyage round the world; a work which,

I doubt not, is generally known to you. It is a most able and entertaining publication; and if any student has not read it, I can strongly recommend it to his perusal; for while professional knowledge should undoubtedly be the first object of your pursuit, general literature should not be neglected, and is so far from being incompatible with that primary object, that it cannot fail to enlarge your views, and give efficacy to your professional researches. So intimate is the connexion between every object of useful and scientific inquiry, that there is hardly one branch of knowledge which does not in some measure throw light and illustration upon another. The circumstance which I am about to mention may illustrate this remark. Lord Anson's book is one of the most interesting works which has appeared on nautical subjects; nor is it without its use as illustrative of a principle in surgery. Lord Anson's expedition to the Pacific Ocean was undertaken with a view of destroying the power of Spain in that quarter. As he was obliged to sail sooner than he expected, many of his crew were invalids, some having cicatrices, and others having had fractured bones, long since united. In his passage round Cape Horn, he encountered very severe weather; many ships were obliged to return, some were lost, and the crews of those which succeeded in getting at last to the Isle of Juan Fernandez, had suffered great hardships. In doubling Cape Horn, the crew suffered severely from attacks of the scurvy; and it was remarked by the chaplain, who was an observing man, though he knew nothing of our profession, that the men who had ulceration before, were attacked with ulcers in the same parts; and if their bones had been formerly fractured, they became disunited. This does not excite surprise, because we know that scurvy produces the ulcerative process, attacking the gums, causing profuse bleeding, &c.; that the ulcerative process has a stronger disposition towards parts newly formed, and that in this case, therefore, it appeared in parts where ulcers had formerly healed, and in disunited limbs where callus had previously formed. When the men obtained fresh vegetables, &c. on shore, they recovered their health; their bones united, and their sores healed. There cannot be a better example than this, to show the readiness with which newly-formed parts ulcerate, when compared with the original organs of the body.

*Parts remote from the heart more readily ulcerate.*—The parts more remote from the heart, ulcerate more readily than those in the vicinity of it. This circumstance led me to say, that when the vital action is feeble, and the power of the circulation diminished, we find a greater disposition to the ulcerative process than otherwise. Thus for one ulcer in the arm, we find twenty in the lower extremities; and it cannot but have been observed in going through our wards, the great number of sore legs, compared with ulcers of other parts.

*Parts little organized ulcerate with difficulty.*—In those parts which are endued with little vascularity, ulceration takes place

with difficulty. This is the case with tendons. Tendinous parts possess very little blood; very few arteries or absorbent vessels are distributed to them. Hence the process of absorption proceeds with great difficulty, and tendons will slough to a great extent, rather than become absorbed. This circumstance must influence our practice. In abscess, under the fascia, an incision should be made as soon as possible through the covering, to liberate the confined matter. So in abscess of the finger, when the constitution suffers, because the theca will not give way to the process of ulceration, and the nervous system becomes irritated by the pressure of confined matter, an early incision should be made to liberate the matter, and give relief to the constitution. The same practice should be pursued in abscess of the palm of the hand.\*

*Use of ulceration.*—The ulcerative process is useful to the animal economy, in removing extraneous bodies from the system. Thus a ball lodged in the body is removed.

*Case.*—A gentleman who had formerly received a wound above the zygomatic arch from a ball, called on me, having a swelling on the side of his face. I asked him whether he thought the ball was there? to which he replied, no. Upon cutting on it, I found that it was the ball by which he had been wounded some years before. It had travelled beneath the zygoma to the middle of the cheek, on the surface of the parotid gland, from whence I removed it; perhaps it was assisted in its course by the action of the temporal muscle.

*Case.*—I saw a boy at Walworth who had been attending a target, at which some volunteers had been firing: he thought himself safe at a distance of thirteen yards; he was mistaken, however, for one of them shot him in the collar bone. Some months after he came to Guy's Hospital, and I removed the ball from near the middle of the upper arm. The ball, by its pressure, had occasioned suppuration and ulceration, which had enabled it to travel to the situation from whence I took it, and the matter was discharged at the wound by which it entered.

It is useful also in the exfoliating of portions of bone, in separating parts which would otherwise remain in the body, perhaps during the life of the individual. In three or four months a considerable portion of exfoliated bone will be separated by the ulcerative process. Thus in the other Hospital the whole of the leg has separated. By my advice nothing has been done, and the pro-

\* The blood-vessels ulcerate with extreme difficulty, and they may be occasionally seen completely exposed, from the destruction of the surrounding parts by the ulcerative process. In the extensive ulcers, which sometimes occur in the groin of debilitated patients, from venereal affection, I have several times seen a portion of the saphæna major vein, as well as a part of the femoral vessels, exposed; and I have a cast in my possession (taken after death from a young woman who died in Guy's Hospital, from an extensive sore of this description), in which this exposure of these vessels is very extensive.—T



cess of nature has been left to take its course, and has been performed in eight months. The bones themselves will separate by the process of exfoliation, and thus nature will herself perform the operation of amputation without loss of blood, and with little danger to life.

I shall now proceed to the consideration of

#### ABSCESSSES.

*Definition.*—An abscess is a collection of matter in a cyst, produced by inflammation.

*Its formation.*—What happens in the formation of an abscess is as follows: First, there is an inflammation of the adhesive kind in the cellular tissue, by which the different cells of the cellular membrane become filled. A slight ulcerative process follows; and the inflammation still proceeding, a little cavity is formed by the ulcerative process: a space being thus produced for the effusion of matter occasioned by the second stage of inflammation. A drop of matter is, at first, secreted into the cavity; and as soon as it is poured out, its pressure occasions an increase of the ulcerative process, which adds to the cavity previously formed; fresh matter is then produced, and the surrounding solids ulcerating, it is accumulated, but it excavates chiefly on the side towards the skin, and very little in the opposite direction; a circumstance which shows that matter has no power of corroding, as was formerly supposed, when it was thought that matter acted chemically on the solids like an acid or alkali.

*Danger of abscesses.*—Abscesses are dangerous, according to the following circumstances:

*From their size.*—First, from their size. It is not, however, the quantity of matter produced which renders them dangerous; but the difficulty which nature has in repairing the devastation made by excavation of the solids, from the pressure of the matter.

An abscess may contain a great quantity of matter, and the constitution may have been scarcely affected by it; but very soon after it is opened, the constitution begins to suffer. It is not, therefore, the quantity of matter, but the process of restoration after the evacuation of the matter, which affects the constitution. The largest abscesses which occur in the body are those of the liver. Patients will sometimes recover from abscesses of this part, in which immense quantities of matter have formed. I remember one of enormous magnitude, from which the patient recovered.

*Case.*—Dr. Saunders, the lecturer on medicine at Guy's Hospital, asked me to see a woman who had a large abscess in the side. I made an opening into it with a lancet, and it discharged a surprising quantity of matter, as much as would fill two-thirds of a wash-hand basin; but I have heard, indeed, of cases of much larger quantities of matter having been discharged. After pressing out the matter, I passed a roller tightly round the abdomen, with a

view of producing the adhesive process, which now and then occurs. I did not see the patient again; but some days after I met Dr. Saunders, who asked me how I thought the patient was proceeding: I told him I supposed he asked me, because he thought me very sanguine; and he replied, that I should be gratified to learn, that the woman was doing extremely well. In fact, no more matter was discharged, and the patient got well, without any bad symptoms. I have mentioned this case, because it may guide your practice when you are operating upon large abscesses, and show you the propriety of endeavouring to procure the adhesive process, by bringing the sides of the abscess together. Very large abscesses sometimes terminate favourably, but in a great number of cases they destroy life.

*From their number.*—The next circumstance which renders abscesses dangerous, is their number. Thus a great number of little abscesses on the surface of the body, in small-pox, frequently destroy life. Here nature performs the suppurative process; the pustules die away, and the cuticle is separated from the surface of the body; but nature has not the power, in many cases, of repairing the destruction of the cutis; the want of which occasions great irritation, and the patient dies, as if destroyed by a burn or scald.

*From their situation.*—Abscesses are also dangerous from their being situated in vitally important parts, such as the brain, heart, or lungs. Abscesses in the brain are very rarely recovered from, nor are those of the heart. Abscesses of the lungs, in some constitutions, are dangerous, but are most recovered from, when the quantity is large.

*From their pressure on important parts.*—They are dangerous even when they are not seated in parts of vital importance, if they press on organs essential to life. A woman was admitted into this hospital for a complaint in the throat, occasioned by swallowing a pointed bone. All she complained of at first was, a soreness in the throat; but she was shortly after seized with difficulty of breathing, which increased until she died. On examination after death, I found, upon making an incision into the pharynx, that between it and the fore part of the vertebra, a large abscess had formed, which, by pressing the pharynx forwards on the epiglottis and glottis, occasioned difficulty of breathing, and in the end destroyed life. Shortly after this, Dr. Babington came to Guy's Hospital with a friend of his, who was labouring under great difficulty of breathing. He requested me to examine his throat; having put my finger on the back of the pharynx, and felt fluctuation there, I told him that this was a case of which I had seen an instance, in which the patient had died from a collection of matter formed in the same situation. I immediately procured a trocar, and passing it into the pharynx, a considerable quantity of matter was discharged, and the patient was relieved. This was a case, which, but for an operation, would probably have terminated fatally by the pressure of the matter on the glottis and epiglottis. In the same

manner, abscesses in the perineum, or between the prostrate gland and the rectum, will by their pressure on the urethra, sometimes occasion retention of urine, and destroy life.

Thus we find that abscesses, though situated in parts not of themselves vitally important, sometimes become dangerous by their pressure on more important organs.

The danger attending the formation of abscesses arises from their size, number, and seat, or from their pressure on important parts: there is also another danger, if abscesses occur between the bones and the covering of bones. Whenever bones form the boundary of abscesses, such abscesses are tedious in their cure, and, in many cases dangerous. Thus it is in psoas abscess: in this disease the matter begins to collect on the fore part of the vertebræ, and proceeds through the psoas muscle, till it reaches the groin, where it makes its appearance just below Poupart's ligament; and from examination of these cases after death, the vertebræ are found ulcerated. It is not my intention now to enter into the consideration of psoas, or lumbar abscesses, as they will be treated of on another occasion; but I just mention the complaint, to show the danger of abscesses between bones and their coverings; and that the reason is, the union between the soft parts and bone is with difficulty produced, and the process of restoration is extremely tedious.

Abscesses are acute or chronic.

*Acute.*—The adhesive inflammation first occurs: this is succeeded by the suppurative; and lastly, the ulcerative process; and it is about three weeks from its commencement, before matter is discharged.

*Chronic.*—But chronic abscesses are slower in their march: take, for instance, the psoas abscess to which we have alluded: it is often six months before matter makes its appearance in that complaint. If a person applies with a psoas abscess, and you ask how long he has had pain in his loins, he will tell you for four, five, or six months. There are varieties in the irritability of different constitutions; but when you see a man with swelling in the groin, which, if he coughs, rebounds under your hand, and has a fluctuating feel, and who, for four or five months, has had pain in his loins, you will say, that he has psoas abscess; so these are the criteria by which you are to know it. Chronic abscess sometimes occur in the female breast.

*Case.*—A lady was sent to me from Sussex some years ago to have her breast removed; knowing the surgeon who had recommended this person to be an intelligent man, I did not at first attentively examine the breast, but said to the lady, I will call on you soon, and perform an operation. I fixed the day, and was about to perform the operation, the patient being seated in a chair before me, when I said to the gentleman who was assisting me, I think that I feel a fluctuation in this swelling, at least I will not proceed to remove the breast till I have ascertained the



fact. I made a small opening into it, and a quantity of matter gushed from the part. Thus a chronic abscess had existed for a considerable time.

*Case.*—Very lately, while visiting Guy's Hospital, one of the young gentlemen brought me a woman who had a chronic tumour of the breast. On examining it, I perceived a slight fluctuation, and stated that most probably it contained matter, but was told, in reply to this observation, that it had existed for several months. I said, however, that is no proof of the absence of suppuration; I made a puncture into it, and let out a quantity of matter, and went away smiling. I merely mention these cases, to put you on your guard; for I have seen two tumours of the breast removed, which were only chronic abscesses; and thus, from an ignorance of this circumstance, you might subject your patient to a cruel operation, where a small incision would have done.

*Treatment of acute abscess.*—In the treatment of acute abscesses, the best medicine you can give is the liquor ammoniæ acetatis, sulphate of magnesia, and opium, of which give small doses, three or four times in the day. By this medicine you lessen irritation, and expedite the suppurative and ulcerative processes; no medicine that I have observed gives so much relief. The sulphate of magnesia prevents any costiveness, the opium tranquillizes the nervous system, and lessens pain. The local treatment consists in the application of fomentations and poultices, to promote warmth and moisture. A greater quantity of blood is sent to the part, and a relaxation of the vessels takes place; this expedites the suppurative process, and then the ulcerative follows with more ease. The kind of poultice to be applied to the part is of little importance, as it is only the medium of applying heat and moisture; linseed meal and water, bread and water, and bread and milk, may be either of them used; the part must be covered with oil-silk, for by its assistance the heat of the part is preserved, and evaporation prevented. It is desirable in the suppurative process to prevent evaporation; oil-silk I generally use in private practice; it is clean, agreeable to the patient, and most conducive to his advantage.

Before proceeding to the consideration of chronic abscesses, I will say a few words on opening abscesses. If an acute abscess goes through its different stages without great pain or constitutional irritation, and is not likely to be of great magnitude, the best practice is to leave it to nature.

*Mode of opening abscesses.*—Acute abscesses beginning under aponeurotic fasciæ, ought to be opened as early as possible, the earlier the better; the moment matter can be felt to fluctuate, it is advisable to make a free opening, both as regards the constitution and the part. Whenever the matter is formed close to a bone, it will be right to open the abscess, excepting in cases where it occurs between the cranium and pericranium, from severe courses of mercury. Mercury will inflame the periosteum (and the peri-

cranium is a part of the periosteum) to a greater degree than the venereal disease itself; and in those cases in which a fluid exists between the pericranium and bone, unattended with any blush, do not open it: it will be removed by purging and giving bountifully the decoction of sarsaparilla. But when matter is formed, and there is a blush on the skin, it will not be absorbed, an opening must be made, exfoliation often takes place; but when there is no such blush, beware of opening the swelling.\*

*Treatment of chronic abscesses.*—The treatment of chronic abscess is very different from the acute. In the last case, you wish to diminish the state of excitement in the constitution; and, in the former, you do all you can to give it additional powers, by allowing a generous diet and giving the ammonia and bark: the ammonia is the medicine on which the principal reliance is to be placed. You know that of late bark has not been much used; but we are apt to run into extremes:—bark assists the suppurative process, and a generous diet must be allowed in order to increase the action of the parts, by giving tone to the constitution. Stimulant poultices should be applied, and the best I know is the muriate of soda (common salt) and water; a table spoonful of the salt to a pint of water, and the poultice should be wetted with this. Yeast and oat-meal, vinegar and flour, each of these expedite the process of suppuration. In indolent cases it is customary to apply stimulant plasters; and the best is the empl. galb. comp.; it is stimulating, and consequently excites the action of the part; the emplast. ammon. cum hydrarg. and the emplast. thuris comp. are also used. The latter is more tranquillizing, and in general excites slight perspiration over the part; similar in its operation to the soap cerate, which is also of use. These then are the remedies, local and constitutional, to be used in chronic abscesses; but it remains to be considered how chronic abscesses are treated when it is necessary to open them. Suppose you are called to a case where there is a collection of matter under the fascia lata of the thigh (the largest abscess in the body,) extending, as it often does, from above the knee to the trochanter major, what would you do? Certainly it is to be opened—make an incision, half an inch in length, and discharge all the matter you can. Having done this, apply a roller, to cover the thigh, with the exception of the opening; the result of this is, in many instances, that adhesive

\* About a year ago, I was asked to visit a gentleman who was suffering from the formation of abscesses between the pericranium and bone. He had been taking large quantities of mercury, for syphilitic complaints, and during its exhibition the pericranium became inflamed. I found, on examination, several tumours of various sizes, situated on different parts of the cranium, and in two or three of them a distinct feeling of fluctuation; more particularly in the largest, which had formed on the forehead. Although the integument was slightly discoloured, the abscesses entirely disappeared, without the matter being discharged, by the free use of sarsaparilla with minute doses of the oxy-muriate of mercury.—T.

inflammation is excited, and the sides of the cavities often readily unite; always taking care, in the application of the pressure to leave the mouth of the wound uncompressed. The same directions are to be attended to in collections of matter, which are to be met with under the tendinous expansion, which covers the muscles of the leg and fore-arm;\* the object is, to endeavour to produce the adhesive inflammation, as in the case of abscess in the liver, that I stated to you, from which the matter was evacuated by the puncture of a lancet, and afterwards by pressure; the adhesive inflammation was produced, and the recovery of the patient was effected. This then is to be your practice—to endeavour to procure an union of the sides of the cavity by the adhesive process.

*Prevention of scars.*—The prevention of scars is a great object, particularly in exposed parts of the body; this may appear of little consequence, but it certainly is not so; scars from abscesses in the necks of females, excite in the minds of most of our sex a reluctance to associate with them; and thus many a fine young woman may, by such scars, be doomed to perpetual celibacy. No part of the practice of surgery has been more faulty than the manner in which abscesses of the neck have been treated. I have seen on one side of the neck large scars from abscesses that had been badly managed; whilst on the other side, where the treatment had been more skilful, scarcely any vestige of a wound was to be seen. I have from very early practice, and subsequent experience has proved to me its use, been exceedingly careful in the management of these cases. Aperients, with calomel and rhubarb, should be given; evaporating lotions should be used: you must be strict as to regimen and diet; the food must be nutritious, but not stimulating. The best mode to adopt in these cases, is to open the abscess before the skin be much affected, and as soon as a blush has appeared; thus scars will in general be prevented. It is desirable, in opening the tumours, to use a very fine knife, for two reasons. 1st. A small opening is made; 2d. It does not alarm the person. The knife I always use, has the blade an eighth of an inch wide, and it appears to the patient as a needle. When you press the sides of the wound, take care to squeeze out all the solid flakes of matter to be met with in scrofulous tumours. If this be not attended to, they will at last slough; but if, on the contrary, you carefully avoid leaving any of that unorganized substance, adhesion will take place, and the wound will heal. Almost every thing, in these cases, depends on getting rid of the solid matter. Bread poultices, mixed with a sulphate of zinc-lotion and spirits, may be afterwards used.

\* The opening in those cases should be made at the most depending part of the abscess, that the matter may be discharged with greater facility; and if any fresh formation takes place, that it may have a free exit, and not disturb the approximation of the sides of the cyst.--T.



*Case.*—Whilst living in Broad Street, in the city, a lady came to me with a tumour in the side of the neck; I perceived on the opposite side several scars; I said, “Will you allow me to try if I can prevent a scar?” She answered, it was for that purpose she had consulted me. Warm poultices had been used on the previous occasions: I made a very small opening, such as is made in bleeding, and squeezed out the contents, and she got well with scarcely a perceptible scar.

It is of the highest importance, then, to endeavour to prevent those appearances, which, on the exposed parts of the body, produce such painful feelings. In the higher orders of life particularly, a child with scars on its neck would be almost excluded from society. There is a point of great importance to be attended to, that is, the direction in which you make the opening; always make it transversely, and not in the axis of the neck; for, when the wound heals, it will be scarcely seen among the creases or folds of the skin. One more observation on this subject; let me entreat you not to open these tumours when they have a purple blush upon them like the hue of a grape: the skin is thin and will slough, and if you then open the tumour, you will bring discredit on yourself. If the sides of the abscess do not unite in any part, a little injection of sulphate of zinc, or copper, may be used.

There are two other points connected with this subject which I will mention to you in conclusion.

*Causes of Hectic.*—First.—The causes of hectic fever. You are all aware that rigors followed by heat, and by perspiration, attend the continued formation of matter; these occur once or twice in twenty-four hours, according to the irritability of the part and constitution; and had it been asked thirty or forty years ago, on what it depended, it would have been answered, absorption of matter into the constitution; and some of the old surgeons used to put sponge to the surfaces of wounds to absorb the matter, and prevent its being carried into the system; but it appears to have no power on the constitution.

There is no doubt, but that the inoculation of putrid matter will sometimes produce fatal consequences; but the proofs that the absorption of common matter into the constitution does not produce irritative fever, are,

First. It is not during the accumulation of matter in abscesses, that the fever appears; but after abscesses have broken, the patient is attacked with it; certainly, the formation of matter will be attended with a slight fever, but not of the hectic kind; the tongue is clean, the pulse very little affected, and the person but slightly deranged: but after an opening is made into the part, constitutional irritation comes on, and life is then endangered.

3dly. The degree of hectic fever is not at all proportionate to the size of the surface on which the matter is formed. Look, for instance, at a large wound of the leg; the person will take his usual

exercise, and feel little or no inconvenience; whilst a small ulcer on the lungs, or intestines, produces hectic fever of the most violent kind.

*Case.*—3dly. Hectic fever often appears when matter has not formed. A woman, who had her leg amputated for a disease in the ankle, came into the Hospital for a pain in the knee of the same side. The symptoms of constitutional irritation were severe: the knee-joint was a little enlarged, violent pain existed in the part, with great constitutional disturbance, and she was obliged to submit to an amputation above the knee. There was no matter formed in the knee, but in the condyles of the thigh bone the ulcerative process had commenced; and the hectic fever was the effect, not of a disease of the knee-joint, but of the cancellated structure of the thigh bone.

In some cases matter has been absorbed, and hectic fever has not been produced. Some years ago, Mr. Cline tried the effect of digitalis on a boy sixteen years old, who had a psoas abscess; the size of the tumour diminished, the skin became flaccid; but as soon as the digitalis was left off, the matter returned; and, during the trial of the medicine, the pulse was lessened, but no hectic fever intervened; therefore, the belief of the absorption of matter being the cause of hectic fever is unfounded; for it is merely the result of the efforts of the constitution to repair an injury, or to cure a disease.

*On the influence of air when admitted into abscesses.*—The last circumstance that I shall mention is, the influence which the admission of air into cavities has in producing local irritation; it is my duty to state to you my opinion; you must think for yourselves. only do not rest contented with thinking; make observations and experiments, for without them your thinking will be of little use. When an opening is made into an abscess, very slight irritation supervenes till the third day; I say the third day, because generally it is not until that time the constitutional disturbance arises. Surgeons of former times, in their opinion on this subject, maintained that it was the admission of air which produced the local irritation attending the opening of abscesses; and endeavoured to cure hydrocele by inflating it after the evacuation of the water. But what was the consequence? when the air became absorbed, the adhesive inflammation had not been produced, and the hydrocele returned. Again, experiments have been made on animals; air has been blown into the cellular membrane of a dog; nothing follows but a temporary stiffness, from the distension of the skin; and when the air is absorbed the crackling goes off without adhesive inflammation.

*Experiment.*—Dr. Haighton made an ingenious experiment, some years ago; he inflated the abdomen of a dog from an opening in the tunica vaginalis; and this mode of doing it evinced his knowledge; for in the dog, and many other animals, there is a com-

munication with the abdomen from the tunica vaginalis. The dog was let loose; he was distended for a few days, but when the air was absorbed he became quite well.

*Anecdote.*—I know a curious circumstance which illustrates this; a butcher was drawn to serve in the militia; and being unwilling to become a soldier, he went to the regimental surgeon, and said that he had a large rupture, which disabled him; he showed it, and the surgeon sent him away. This man had made a puncture just above the scrotum, and inflated it with a blow-pipe, used in inflating the cellular tissue beneath the integument before flaying; the man himself mentioned it afterwards as a good joke.

What takes place when a lung is wounded and air is admitted into the cavity of the chest? The air inspired enters into the cellular tissue, the face and body become bloated; but it is afterwards removed by absorption, without producing any inflammation.

He who holds that the admission of air produces the irritation attending the opening of abscesses, takes a narrow and partial view of the case; for the cause of the irritation is as follows: If a wound be made into any cavity of the body, be it an abscess or a natural cavity, soon after the vessels of the part are divided, inflammation arises to heal the wound, whether it be exposed to the air or not. If it heal by adhesion, the influence is slight and directly terminates; but if the adhesive inflammation be insufficient or imperfect, then a suppurative inflammation follows, and granulations arise, which process produces violent influence both upon the part and constitution. The cause is, therefore, the division of the blood-vessels, and the presence of air; and its degree depends upon the ease or difficulty with which the injury is repaired.

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## LECTURE VII.

### ON GRANULATION.

WE have endeavoured to describe the first mode in which the union of wounds is produced; namely, by the process of adhesion. We shall now proceed to consider the other mode of union of divided parts; namely, that by granulation; for the two processes which nature institutes for the purpose of filling up ulcers, and for the cure of wounds, are adhesion and granulation.

*Definition.*—A granulation is a newly-formed substance, generally red in colour, and having the power of secreting pus.

*Its information.*—The mode in which a granulation is produced is as follows:—It is a process very similar to adhesion, but differing from it in one respect.

When an abscess has been opened, or a wound has been produced, if the abscess be not immediately closed, or if the edges of the wound have not been brought together, inflammation is ex-



cited, and it occasions an effusion of the fibrin of the blood upon the surface of the wound. This fibrin is poured out in a layer which covers the raw surface. The layer of fibrin, or adhesive matter, soon becomes vascular; for blood-vessels, which are elongations of the vasa vasorum of the divided arteries and veins, are forced by the action of the heart into the fibrin which has been deposited, and this layer consequently becomes organised. The difference between the mode of union by adhesion and granulation is, that, in the latter, the vessels shoot through the layer which has been thrown out, terminating by open mouths on the surface of the newly-formed substance, and secreting pus, at the same time that more fibrin is effused. The fibrin, which is poured out with this purulent secretion from the vessels, forms a second layer, into which the vessels supporting the first deposit of fibrin become elongated, and are the means of supporting the second covering, terminating as before, by open mouths on the surface of the substance effused. In this manner layer after layer is formed until the cavity becomes filled.

The difference in the process may be easily explained. Suppose an abscess be opened; the result is, that adhesive inflammation is produced on the internal surface of the cavity. A layer of adhesive matter is thrown out; and if the sides of the abscess are brought together by a roller, you may often prevent the future formation of matter. But if the union by adhesion does not take place then, granulations are formed as I have described.

*Character of granulations.*—The characters by which granulations are distinguished are these: their surfaces are uneven, they are generally red in colour, and they secrete matter.

*Their vascularity.*—The vessels shooting into granulations are very numerous. If you inject an ulcer of the leg, the great degree of redness in the granulating surfaces is accounted for, by the number of vessels divided into radiated branches, which enter the granulations, producing the arborescent appearance observed in them.

In examining the structure of granulations, they appear to become vascular in the following manner. Arteries enter at the base of the granulations and then divide into radiated branches; from these vessels pus is secreted, and an incrustation is formed produced by a layer of adhesive matter, on the surface of the granulation. This is a little difficult to conceive: it is a circumstance which, I believe, has not been observed, and which I learned in the following manner: I took a portion of injected ulcer from the arm, threw it into alcohol, in order to observe its vascularity. After it was immersed in the alcohol, it was so opaque on its surface that no blood-vessels could be seen. It was the fibrous matter covering the surface of the granulations which had not yet received the blood-vessels.

A granulation may be considered as a gland, and the surface of an ulcer merely as a glandular surface. A gland is a part of the

body in which secretion proceeds from the extremities of the arteries, and the blood which is not employed in the secretion is returned to the heart by means of veins which accompany the arteries. So in granulations, the arteries throw a quantity of blood near the surface of the wound, and there secrete pus. There is a vein accompanying each artery, and the fluid conveyed by the vessels is partly converted into pus on the surface of the ulcer, and is in part returned to the heart by the vein. Whilst the pus is secreting, fibrin coagulates upon the surface of the ulcer.

*Their powers of absorption.*—Granulations are not good absorbent surfaces in ulcers recently formed; but if the ulcers have existed for any length of time, the absorbent vessels readily take into the system some substances which may be applied to them. In this way we frequently see persons salivated by the use of injections of the oxymuriate of mercury. It is not an uncommon practice to inject a solution of oxymuriate of mercury into sinuses, for the purpose of stimulating the vessels to produce granulations. If the sinus has existed for a considerable time, the oxymuriate of mercury is frequently absorbed, and the mouth becomes affected in the same manner as if the mercury had been absorbed into the system by rubbing it into the skin, or taking it into the stomach. This proves that old granulating surfaces have the power of receiving by absorption a fluid of this description.

I have known what is commonly called the black lotion, which is composed of the liquor calcis, and the submuriate of mercury, when applied to the surface of ulcers, produce an effect upon the mouth in persons who are easily affected by mercury. I believe that the lotion of the liquor calcis and calomel often produces good effects in sores, by the mercurial action which it excites in the system, and not merely by its local effects on the sore to which it is applied. Ulcers are, however, frequently the means of producing baneful effects upon the constitution, by the readiness with which they absorb some substances which are applied to them. Thus, arsenic applied to the surfaces of sores is very frequently absorbed into the system; and on this account arsenic is to be regarded as a very dangerous remedy. With respect to the use of arsenic as an internal or external remedy, it ought never to be employed without extreme caution, and unless the patient is watched from day to day.

*Case.*—I remember a case, in the other Hospital, of a patient, who was brought in with a fungus in the eye, and who was under the care of Mr. Lucas, a man of skill in his profession, and the father of the present surgeon of that name. Mr. Lucas ordered a solution of arsenic to be applied to the part. After it had been used for three days, the man complained of pain in his stomach; but this was not supposed to arise from the use of the solution. The application was continued; the pain in the stomach became excessive; convulsive tremors of the muscles succeeded, and the patient died. It was quite clear that he died from the influence of

arsenic in the system; and, upon examination of the body after death, the stomach was found in the highest degree inflamed, and exhibiting the peculiar appearance which is produced by arsenic, and not by poisons generally. I believe, therefore, that this person died from the application of the arsenical solution.

Quacks are in the habit of destroying tumours of the breast by the use of arsenic. Women will undergo any torture which is not inflicted by a knife, rather than submit to an operation that would not give them a tenth part of the pain which they suffer from such applications. They apply to a person who tells them of a number of cures he has performed by means of a specific used for the purpose of destroying cancerous affections; and indeed they very frequently destroy the part and the patient too. Mr. Pollard, the surgeon, told me of a person, in town, who applied an arsenical preparation for a scirrhus affection of the breast, and the patient died in less than a week.

I had myself occasion lately to perform an operation for a scirrhus breast, to which arsenic had been applied. I asked the woman, which gave her most pain, the application of the arsenical preparation, or the operation. She replied, that the pain of the operation was not greater than that of the application, and that the arsenic had been applied ten or eleven times. These remedies become absorbed and produce derangement of the stomach, the intestinal canal, and the nervous system, and sometimes paralysis.

*Case.*—While I am on this subject, I will mention a case to you, which I should scarcely have believed if it had not come within my own knowledge, that of Sir Wm. Blizard, and of other surgeons. A person in this metropolis happened to have bow shins. A part of his duties was to teach young ladies to draw and paint; and in the prosecution of this branch of his profession, he found his bow shins, as he himself declared to me, a very great evil. He felt that his merits were less appreciated, and his instructions less kindly received, by reason of the convexity of his shins; he was persuaded, in short, that his bow shins stood between him and his preferment. Under this impression, he went to a very noted person in this town, and said to him, “Pray, Sir, do you think you can make my legs straight?”—“Sir, said the Doctor, “I think I can: if you will take a lodging in my neighbourhood, I think I can scrape down your shins, and make them as straight as any man’s.” A lodging was taken; the father of the patient assisted in the operation, and the father and the Doctor took a turn in scraping down the convex shins.

A great deal of rasping was required; an opening of very considerable extent was made in the shin, and an instrument, which was at that time contained in the Surgeon’s trephining case, called a *rougée*, was employed to scrape the shin bone. When the Doctor was tired of rasping, the father took a spell. At last the shell of the bone became so thin, that the Doctor said they must proceed no farther with that leg. The other leg was then rasped in a simi-



lar manner, and thus large wounds were produced in both of the shin bones. The surfaces granulated very kindly, and very little exfoliations of the bones took place; but, unluckily, in a part of this process the Doctor applied arsenic upon the limb. It was in consequence of the effects of this application that I saw the patient. The arsenic was absorbed into the system, and he became paralytic in his arms and lower extremities. A great number of exfoliations took place in his legs; and he showed me a box in which the exfoliations were contained. I recommended him to go into the country, where he stayed for some time, and got rid of his paralysis. This case made a great noise in town; and there were some surgeons who expressed a strong wish to prosecute the Doctor. I recommended, however, that no steps should be taken until I had seen the patient himself; and when he next came to me, I asked him whether he thought his legs improved, and if he would undergo the same operation, at a similar hazard of his life, to have his legs made a little straighter. He replied that he would; and under these circumstances I was of opinion, that as the young man was content, it was a folly to think of prosecuting the Doctor. Some time has elapsed since the case occurred, and the transaction is now almost buried in oblivion. The person who underwent the operation still lives, and is pleased with his improved legs; and the Doctor lives also, and is well known to most of you, at least by name.

Opium, when applied to the surface of sores, is very readily absorbed into the system. I believe that it is often a very useful application to the surface of wounds. A case of tetanic affection happened in a child, whose leg had been amputated by Mr. Lucas, the late surgeon of Guy's, and the application of opium to the stump gave more immediate relief than I ever remember to have witnessed. It relieved the spasms, and, as I believe, saved the child. If opium, applied to the surface of sores, be absorbed into the system, it produces excessive costiveness, extreme pain in the head, and torpor of the system, which is only to be removed by the frequent administration of active purgatives. The effects on the constitution, when thus absorbed, are very much the same as when it is introduced into the stomach. I have known a solution of opium, applied upon an extensive scald in a child, destroy it.\*

*Granulations sensible.*—Granulations possess nerves as well as arteries, veins, and absorbent vessels. They are sometimes extremely sensitive; but this is far from being the case in all granu-

\* I have seen a temporary amaurosis produced in two cases, by the application of the extract of belladonna to the surface of irritable ulcers of a malignant character. In one case, the disease was situated in the vagina, and in the other in the rectum. The pupils of the eyes were extremely dilated, as from the application of the extract to the organ itself, and the patients were incapable of distinguishing any objects for some hours. In the case of ulcerated vagina, I repeated the application, when it produced exactly similar effects.—T.

lations. We shudder at seeing a person handle a sore roughly, supposing that it must give the patient extreme pain. Granulations which spring from parts endued with great sensibility, as the skin, are indeed extremely sensitive; but many granulations, such, for instance, as those which arise from bones, have no sensibility. If ulceration be produced to a considerable extent, on an exposed bone, and granulations arise, a probe may be put into them, and the patient is quite insensible of your touching him; but if you apply the probe to the edge, or near the edge of the wound, he will feel it. Granulations, therefore, springing from bone, in an uninflamed state of the bone, are not sensitive. Those, however, which spring from the cancellative structure of the bones, are sometimes extremely sensitive. I have, at present, a patient who had a compound fracture of the leg; the fracture was attended with abscess, and a small exfoliation of the bone took place. In this case, when a probe is put down into the cavity, the granulations from the cancellated structure of the bone are highly sensible.

When the inflammation passes away, the sensibility of the part is diminished. The same thing happens with respect to granulations, springing from tendons, as the tendo Achillis, for instance, which are perfectly insensible. So granulations arising from fascia, and the aponeurosis of muscles, are endued with little sensibility. In general, therefore, although granulations springing from parts possessed of great sensibility, are exquisitely sensitive; those arising from parts in a great degree insensible or entirely so, as tendons, are not sensitive: a circumstance which you may have an opportunity of witnessing any time you visit these large hospitals.

*Granulations readily unite.*—Granulations very readily unite with each other. The mode in which union is effected, is, by bringing the edges of the two granulating surfaces together, so as to produce the adhesive process. The surface of the granulations is covered by adhesive matter, and you have only to apply the two surfaces to each other to produce an union. The knowledge of this principle is very often useful in the practice of surgery. A man has a considerable portion of the scalp raised from the skull, and the pericranium throws out granulations, whilst the raised portion of scalp is also granulating. Instead of waiting for the tedious process of granulations filling the cavity, you have only to place one portion of the granulations upon the other, bind them well down with adhesive plaster, and they will often inosculate. In this manner a surface, which it would otherwise require a long time to close, will be healed in a few days. The cavity of the scrotum, after removal of a testicle, is often covered with a great number of granulations; yet by bringing the surfaces together with adhesive plaster, a wound which would otherwise require weeks in granulating, will be healed in a very short time.

It was upon this principle, namely, that of bringing together granulating surfaces, that Mr. Baynton proceeded with so much

success in the treatment of ulcers; so that our hospitals are now much less filled than they formerly were with those opprobria of our art.

#### OF CICATRIZATION.

The next subject to which I shall direct your attention is, the closing of sores by cicatrization. The formation of new skin with which a sore is covered, is called cicatrization, which takes place in the following manner.

*Mode by which it is produced.*—The vessels at the edge of the skin form granulations, and these unite with the granulations of the surface of the sore; those produced from the edge proceed towards the centre, and inosculate with the others on the surface of the sore, and are united by the adhesive process. The vessels become elongated from the edge of the sore, and proceed in radii from the circumference to the centre. Day after day an addition is thus made to the cicatrix, until at last the vessels reach the centre from every part of the circumference, when the process of cicatrization is completed.

It may be said by some persons, that this is not the only mode which nature takes for the formation of new skin, for it often happens that the process of cicatrization commences from the centre of the sore. If these persons mean to say that insulated portions of skin are sometimes seen in the centre of sores having no communication with its edges, there can be no doubt of the fact.

But how does this happen? It is not that the centre of the sore has the power of forming new skin, but that the new skin in the centre is produced in consequence of the whole of the original skin not having been destroyed, and granulations arise from the part of the skin which was left. This happens in irregularly formed sores, where the healing process has gone to the centre, and then the sore has broken out in the circumference. If granulations arise from any portion of skin in the centre, these granulations form new skin, and an insulated portion of skin is produced, forming a part of the cicatrix.

*Appearance of a newly-formed cicatrix.*—When a cicatrix is at first formed, it is extremely vascular; but if it has existed for any length of time, the blood-vessels become contracted, and it is whiter than the original skin. Hence the white appearance of the cicatrices after small-pox; for, although they are more vascular than the original skin, when first formed, in a little time they lose their vascularity, and are endued with less living power than the surrounding parts.

*Time in which an ulcer becomes cicatrized.*—The readiness with which the surface of a sore is covered in by cicatrization, depends very much on its form. A sore of a circular form, requires a very considerable time before it will heal; whereas a sore of much greater length, but of less diameter, will heal more quickly. You



may always pronounce, therefore, that a round sore will be longer in healing than a longitudinal, *cæteris paribus*. The reason is, that the vessels have to elongate much less from the edge to the centre in a longitudinal, than in a circular sore. The form of the sore, therefore, has an influence on the readiness with which cicatrization takes place.

Sores are very often difficult to heal from their situation. Thus, if a sore be situated at the back of the leg, there will be often great difficulty in healing it. Indeed such a sore can only be healed by raising the heel, and so loosening the skin, in order to give it a power of being drawn in to form a new cicatrix. By this means the vessels are more readily elongated, and continually draw the skin nearer the centre of the sore. It appears, then, that the form and situation of the sore have a very considerable influence on the healing power. Where there is much loss of skin, ulcers heal with great difficulty, because the skin must form from the edge to cover the sore, and the edges will not easily draw in.\*

*Contraction of cicatrices.*—After the cicatrization of an extensive sore, more especially when it has been produced by a burn, the new-formed skin contracts, occasioning great deformity; and if near a joint further mischief ensues from its motions becoming impeded. Here is a model, representing the case of a patient who had been severely burnt, and in which extensive deformity had supervened on the cicatrization of the wounds. The chin had become united to the breast, the arms to the sides, and the upper arm to the fore arm.

Now some of you might be induced to exclaim, how abominably inattentive must the medical man have been who had the care of this patient; for all these consequences might have been prevented. If you said this, your censure would be culpable; you have no right to say so; for it is a case which might happen to any of you. Deformities of this kind generally arise after the process of healing is completed; they are the effects of the contraction of the cicatrices. Here the skin is contracted, so as to pull down the chin, and evert the lip, so that the saliva runs over the surface of the breast, and is constantly excoriating it. All these results proceed from the contraction of the cicatrices. I say this, from having seen, among many other cases of the kind, that of a child, who was admitted into Guy's, in consequence of the contraction of cicatrices, the upper arm adhered to the fore arm; and the thumbs were drawn back so as to be immoveably joined to the fore arm.

*Case.*—I will mention another case. Some time ago a young gentleman, who was playing with gunpowder, happened to be

\* The process of cicatrization is extremely slow on ulcers situated in those parts of the surface which become folded, or of which the position frequently varies from the motion of joints, as in the groin from the motions of the hip, in the ham from the motions of the knee. It is from the constant disturbance of the granulations; and on this account, extensive sores in the groin, more particularly, are extremely difficult to heal.—T.

slightly burned in the forehead. His father, who was a very intelligent man, showed considerable anxiety, and expressed his apprehensions at the time that some horrible deformity would arise from this accident; for he had himself witnessed instances in which the eyebrows had been drawn up, so that the patient had no power of closing his eyes, from a similar cause. Granulations, however, very soon arose on the surface of the forehead; the sore healed kindly, and the father was delighted to witness as he supposed the favourable termination of the case. Some time after, however, I saw this gentleman; and upon inquiring after the child, he told me, that he was very well, but that a deformity had ensued from the accident; the eyebrows were drawn up, the eyelids elevated, and the forehead was wrinkled. This took place a few weeks after the healing of the sore, in consequence of the contraction of the cicatrix; and unfortunately it was a deformity incapable of being remedied by any means which art could suggest. I have never seen a case like that represented in the plaster bust on the table, where the chin is united firmly to the breast, which was capable of being cured. There are some parts of the body, however, in which deformities of this kind may be removed; as in cases in which the thigh is united to the abdomen; where the bridle of skin may be divided, and the joint afterwards straightened; but where the bridle is broad, and not separated from the muscles, as under the chin, no operation will avail.\*

*Parts reproduced.*—In the formation of cicatrices, the original parts may all be reproduced, except two. In the first place, new skin, though differing somewhat in texture and smoothness, is still a substance similar to the original skin. Skin may be defined to be a substance producing rete mucosum and cuticle. Are both produced by the newly-formed skin? Undoubtedly. The cuticle is produced very quickly: and with respect to the rete mucosum, or colouring matter of the skin, a little time elapses before it is formed, but it is reproduced, as the following fact will show. The new skin of a negro does not become white as in Europeans, but is at first red, and after a time turns blacker than the original skin. I was struck with this in Guy's Hospital, in the case of a negro, who had been a sailor on board a privateer, and had received wounds in several parts of his body. I observed that the cicatrices were darker in colour than the original skin. We may conclude, therefore, that the skin which is reproduced is true skin; that the cuticle is very quickly reproduced, and the rete mucosum after a longer period. The cellular membrane is also reproduced, although it has at first the appearance of a solid fibrous mass which requires some time before it is drawn into the reticular texture of

\* When the cicatrix is not very extensive, and is producing much deformity, or impeding the motions of a joint, Mr. Earle has proposed that it should be removed by the knife, and a case is related in the fifth vol. of the *Medico-Chirurgical Transactions*, in which he performed this operation with success.

the original membrane. Tendons are very easily reproduced. If the tendo Achillis be divided in an animal, it will be reproduced in about a fortnight, or three weeks; but it will be of greater size than the former tendon. The same takes place in the human subject; as you may see from two specimens in our Museum, of the tendo Achillis, which had been reproduced, and which are larger than the original tendons. Every body knows that bones are reproduced; not only the shell of the bone, but the cancellated structure; not only the salt or phosphate of lime, but the cartilaginous substance, in which it is deposited. Nerves are also reproduced, but there is some doubt whether the restoration of sensation is assisted by anastomosis. Dr. Haighton made an ingenious experiment with respect to the union of nerves. He divided the par vagum, or eighth pair of nerves, in a dog, on one side, and let the animal live for some time; he then divided the par vagum on the opposite side, and after suffering both nerves to unite, he then divided them at the same time, when the animal died.

In "tic douloureux," after the operation of dividing the nerve, even when the sensibility of the part to which the nerve was distributed is not entirely restored, and although numbness still remains in the cheek, the painful sensation still returns. An old gentleman from the neighbourhood of Bury, in Suffolk, had undergone the operation of the division of the nerve for "tic douloureux" several times. When he came last to me, there was still numbness remaining in the lip, yet the pain of the "tic douloureux" was as great as ever. I divided the nerve, but the operation did not afford him the same relief as before. He came again some months after, and wished the nerve to be again divided. The pain in the part had returned to its former degree, although the numbness of the lip was much greater than before.

*Parts not reproduced.*—The parts of the body which are not reproduced, are, First, muscles. In the case of a man, who had a scar in the fore arm, which appeared to have long existed, I found, instead of muscular fibre under it, the tendinous structure I now show you. A muscle when divided unite by tendon in this case, and not by muscle. Secondly, the cartilages of the ribs unite by bone, and not by cartilage. Here is a specimen of cartilage of the human ribs which had been divided, and in which ossific union had taken place. This, however, will depend, in some measure, on the age of the person; for in very young subjects cartilaginous union will be produced, but in persons more advanced in years, the cartilages of the ribs unite by bone.



## LECTURE VIII.

## ON ULCERS.

IN treating of this subject, I shall first describe the appearance of ulcers in what may be termed their healthy state; I shall then detail the several circumstances which render their cure difficult, and proceed to point out to you the various remedies which they require under their different modifications.

*Definition.*—An ulcer may be defined to be a granulating surface secreting matter. When an ulcer is in a perfectly healthy state, the appearances which it exhibits are as follow: The granulations are of a florid hue; their blood-vessels possess a considerable quantity of arterial blood, and the freedom of circulation produces this florid appearance. The granulations are equal on the surface of the sore, rising a little above the edges; for it is necessary, in order that a sore should heal kindly, that the surface of the ulcer should be a little more elevated than the surrounding skin. The surface of the sore secretes matter which has a milky appearance, or rather the appearance of cream. The edge is granular, and adapts itself to the surface of the ulcer. In this manner the granulations which spring from the surrounding skin, are well approximated with the circumference of the sore, so that the granulations on the surrounding edge unite with those of the surface. When, therefore, the surface of an ulcer is red, the granulations equal, rising a little above the edge, surrounded by a discharge of healthy matter, and the edge of the sore is nicely adapted to the surface, you will say that such an ulcer is in a healthy state. In order to produce this state of the sore, the best practice which you can generally pursue is, to apply poultices and plasters.

*Principles of treatment.*—When an abscess is opened, or a wound is produced which cannot be healed by the adhesive process, the best application for the purpose of exciting the growth of granulations, is a poultice. This poultice must not be too warm; as it is, by its gentle warmth and moisture, to encourage such a degree of action, as may promote the growth of the granulations, and form a soft bed into which they may spring. When the granulations have risen to the edge of the sore, this practice must be altered; and it becomes our object to adapt the granulations of the edge to those of the surface. For this purpose adhesive plaster, or unctuous substances, are employed, with a view of pressing down the granulations of the edge of the sore on those of the surface, so as to make them unite. These are the means to be adopted in the cure of ulcers. We first encourage the growth of granulations by the applications of poultices; and when the granulations have risen to the edge of the surrounding skin, we press down the granulations of the edge on those of the surface.

Such are the principles of treatment applicable to ulcers in the

healthy state. We will now proceed to consider the impediments which frequently occur to the healing process and which render a different mode of treatment necessary.

*Impediments to the healing process.*—The first circumstance which renders the cure of ulcers difficult, is the *too prominent state of the granulations*, producing what is vulgarly called, proud flesh. In this state, the granulations rising considerably above the edge of the surrounding skin, are necessarily prevented from uniting with those of the edge. In order to prevent the continuance of this state of the sore, the common treatment is, to apply dry lint to the centre of the ulcer, and some unctuous substance to the edges. The lint, by its pressure, prevents the growth of granulations in the centre, while the unctuous substance allows the granulations on the edge to proceed, and inosculate with those on the surface of the sore. The lint should not be applied to the edge; for if it be, the granulations will be prevented from proceeding towards its centre. The nitrate of silver, and the sulphate of copper, are employed for the purpose of destroying luxuriant granulations near the edge of the ulcer. Lint is, therefore, applied to the centre of the sore, for the purpose of keeping down the granulations on the surface; whereas the caustic is applied on its circumference to check the too rapid growth of the granulations which are nearest the edge of the sore. Thus the healing of the sore is promoted, and a little circle is formed by the caustic from day to day, until it arrive at the centre.

Adhesive plaster is also used to press down the granulations. The common adhesive plaster is, however, too stimulating for this purpose; a plaster composed of equal parts of the emplastrum thursi compositum and the emplastrum saponis, is a much better plaster to promote the healing of ulcers, than the common adhesive plaster. This is a point deserving attention; because if the application is of so stimulating a nature as to excite inflammation, and excoriate the skin, we are often under the necessity of abandoning its use. It sometimes happens, that the action is so great as to oblige us to apply a sheet of lead to the surface of the sore; when this is necessary, you may apply, first, a piece of lint covered with the ceratum cetacei, over this a piece of sheet-lead, which should be confined by a roller. These are the various modes of treatment in this state of the sore.

*Granulations languid.*—The next circumstance to which we shall advert, as giving rise to difficulty in the treatment of ulcers, is a *languid state of the sore*, in which its action is deficient. What is the character of such a sore? You may know that it is in this state, by the glassy and semi-transparent appearance of the granulations; instead of the florid hue which characterise granulations in their healthy state, a considerable portion of them is bloodless. The fact is, that the heart and vessels of the surrounding parts have not sufficient power to throw the blood to the surface of the granulations.

To remove this buffy appearance, and produce a healthy state

of the sore, the application most commonly used is the unguentum hydrargyri nitrico oxidi. This is a strong stimulating application, which occasions a determination of blood to the part, and produces a florid redness in the granulations, instead of the semi-transparent appearance which they assume in the languid state of the sore. It produces, however, a white appearance in the edge of the sore, arising from the thickened state of the cuticle, which prevents the growth of the granulations on the edge. This may be corrected by the application of the unguentum hydrargyri fortius to the edge of the ulcer.

Lotions are frequently applied with the view of stimulating these languid sores; such as the sulphate of zinc, in the proportion of two grains to one ounce of water; or the sulphate of copper in the proportion of one grain to an ounce. The oxymuriate of mercury and the liquor calcis are also used, for the same purpose, in the proportion of one grain to an ounce. In addition to these applications, it will be necessary to bind up the sore with a roller, and to allow the patient to take exercise, to produce action, and to excite a healing disposition in the sore.\*

It will be highly useful in these cases to employ some stimulating plaster, such as emplastrum galbani compositum, for the adhesive plaster will not always answer the purpose, when sores are languid, and the object is to increase the action in the part: this will also be greatly assisted by giving the patient a nutritious diet, allowing him, at the same time, to take exercise; and, in fact, doing every thing to improve the constitution.

*The inflamed ulcer* we shall next describe. When the surgeon goes round the hospital on the first day after the admission, he will meet with a number of persons with inflamed ulcers on their legs; and what is the character of these sores? There is a discharge from these wounds, composed of serum, and the red particles of the blood, with a disposition in many cases to slough; the surface is covered with a brown incrustation, and the skin and surrounding parts are highly inflamed.

You will find that the same treatment, which is applicable to inflammation in general, will be of service in these ulcers, where inflammation has existed for a long time to a high degree. Rest must be enjoined; and the patient must be kept in bed, in the recumbent

\* I have a great objection to the application of ointments to ulcerated surfaces, and scarcely ever employ them, for the following reasons. In many cases the grease of ointment creates irritation, which is proved by the good effects resulting from the application of a lotion possessing the same medicinal properties, as an ointment which has previously caused irritation. When an ulcer is deep or irregular, it is difficult to place a dressing of ointment in contact with its whole surface, consequently it only acts partially, and besides, by adhering to the edges of the wound, and the surrounding parts, much time is necessarily required at each dressing to remove it.

Lotions will effect every thing that can be done by ointments in these cases; they have the advantage of being readily applied to the whole surface, and are more cleanly.—T.



posture. Fomentations and poultices should be employed; fomentations will tend to produce a secretion from the part, and poultices to promote the growth of granulations. With these applications the vessels begin to shoot, the sore assumes a better aspect, healthy secretions are thrown out, and granulations form, fibrous matter is deposited, and in a little time you will have the skin cover the wound. Fomentations, poultices, rest, and the recumbent posture, must be enjoined, and the patient be freely purged; the best cathartic that you can administer is calomel and compound extract of colocynth, and a draught of the infusion of senna and sulphate of magnesia on the following morning; by this plan you will do more to subdue the inflammation, than by any other that I know.

If the part in the neighbourhood be much inflamed, leeches had better be applied near the circumference of the ulcer; with this treatment, in a few days granulations will spring up, pus will be secreted, and the surrounding edges will assume a healthy appearance. Without, however, attending to the constitutional treatment, all your local applications will be of little avail.

*Of gangrenous ulcers.*—This kind of ulcer is very frequent in a man who has been in poverty and distress for a long time, walking the streets of London, looking for an asylum where he may rest his head: this person, at last, comes to an hospital, in a reduced and emaciated state, with a gangrenous ulcer. When you see a wound of this description, you will know it by the surface being free from discharge, the surrounding edges of a livid appearance, with small vesicles or blistered spots on them, and the patient suffers much from irritative fever; seeing this state of the wound, you enjoin the patient the recumbent posture, which is essentially necessary to promote separation of the dead parts.

The principle treatment in these cases is, to produce a very slight increase of action in the part; previously, when the action is excessive, you must, on the contrary, soothe and tranquillize; both will be, therefore, good in different stages. When there is debility, slight stimulus should be employed; but when there is excessive action stimulus must be avoided.

The best application to produce a slight stimulus, and check gangrene, is the nitric acid, there is none equal to this: fifty drops of it to a quart of distilled water will be found a most useful remedy; the acid may be increased to a drachm, this may be done or not as it gives pain, but generally the average strength is fifty drops. I have seen, in a short time after this application, a quick separation of the parts from sloughing, to which there is always a tendency; and healthy granulations spring up, being, as the chemists would call them, highly oxygenated. The granulations are of a beautiful florid red.

Oiled silk should be applied to the wound, to prevent evaporation, and preserve the moisture of the linen for many hours. An advantage, though a slight one, compared with the others, in the use of the nitric acid is, that the offensive smell is nearly removed by it. Another very good application to sores of this kind is nitre,

in the proportion of one drachm to a pint of water; this agrees very well with the sore, and has the same effect with the nitric acid, though in a diminished degree. Sulphuric acid is of use also in these cases, six drops of the acid to four ounces of water; the muriatic acid has not the same effect as the other mineral acids. If nitric acid be applied to the wound, the granulations will assume a red and healthy look; if the sulphuric, they will have nearly the same appearance; but if the muriatic acid be put to the wound, it will have a comparatively slight effect on the granulations, and, therefore, it is an inferior remedy in the treatment of ulcers. Port wine, porter, dregs of beer, and yeast, made into a poultice, are also useful.

You must have recourse to a great variety of applications; for after you have tried one, which at the beginning was useful, you will, from the wound becoming accustomed to its stimulus, be obliged to change it for another. There is, at this time, a girl in the other hospital, with sloughing of the pudendum; a variety of means have been used, each of which, at the outset, relieved her a little, but did not continue to do her good for any length of time, and she will, most probably, in the end fall a victim to the disease; it is upon this account that I mention so many remedies. The carrot poultice is also a very good application. The constitution of the patient must be attended to, or the local means will do very little; therefore, local applications must be aided by constitutional remedies, and the best medicine that you can administer is opium with ammonia—twenty drops of tincture of opium three times a-day, with ten grains of the carbonate of ammonia in an ounce and a-half of camphor mixture, and a little of the compound tincture of cardamom.

This is the medicine which will agree best with the patient; he must be well nourished, or at least he must have as much as his digestive powers will bear; port wine also must be given, and spirits may be allowed to those who have been addicted to their use: by brandy and opium I have seen these sores cured; in fact, they are our sheet anchors in the treatment of these ulcers. But I shall have to speak of this again in the Lecture on Gangrene.

*Irritable ulcer.*—The next kind of ulcer is the *irritable*. This sore is extremely difficult of cure. How are you to know it? When you find the granulations most unequal; in some parts being very high, in others depressed. The discharge from the wound consisting of a bloody pus, which is pus mixed with the red particles of the blood. This sore, then, may be known by the inequality of the granulations, the nature of the discharge, and the great pain and tenderness in the part; so that the patient is like a sensitive plant, shrinking from the slightest touch. As you will find considerable difficulty in the treatment of these sores, I will tell you the best application that you can use: a compound of cetaceous ointment, mercurial ointment, and powdered opium, agrees well.

℞ Unguent. cetacei.  
 Unguent. hydrarg. mit. āā ℥ss.  
 Pulv. oppii. ℥j. M.  
 Fiat unguentum.

This must be spread on lint, and applied to the part twice a-day.\* The internal remedies you ought to exhibit in these cases are calomel and opium: these are the medicines on which you are to rely: a grain and a-half of calomel, and a grain of opium, morning and evening. Nothing will be of so much service as this medicine. It should not be carried so far as to produce ptyalism, or to affect the constitution severely; but it should be given so as to restore the secretions, and to diminish the excitement of the nervous system. The calomel will do the first, and the opium will lessen the nervous irritability. The treatment of inflammation has been improved of late, by exhibiting calomel and opium. The effect of this medicine in inflammation may be seen in the disease called iritis. Here calomel and opium must be exhibited: nor should a deposit of adhesive matter into the anterior chamber of the eye, be any bar to their use. Give five grains of calomel and a grain of opium night and morning; and in the space of a week, if the eye has not suffered so much as to be disorganized, this remedy will correct the inflammation, and vision will be restored.

We use other remedies, such as the compound decoction of sarsaparilla. Some think it a placebo; others have a very high opinion of its efficacy. I do not think much of it myself in these cases; but after the use of mercury it diminishes the irritability of the constitution, and soon soothes the system into peace. With this view, its aid, combined with other remedies, may be here of use. Before I conclude this part of the subject, I will mention a case which just occurs to me; I allude to that of Mr. Lucas, the surgeon of the other Hospital. That gentleman, in consequence of having pricked his finger, had a very irritable sore, which obliged him to go into the country where he remained a considerable time. The remedy which he found most efficacious for bringing the sore into a healing state, was the application of a solution of nitric acid, very

\* In these cases I usually employ a lotion, composed of lime-water, mucilage, and opium, in preference to the ointment, for reasons I have before mentioned. As a general remedy to irritable ulcers, I can with confidence recommend it strongly, as I have had ample opportunity of witnessing its good effects. It is applied on lint or soft linen to the ulcerated surface; and a portion of oil silk, or a light poultice, is placed over it, to prevent the lint from drying. In preparing the lotion, the opium must be dissolved in the lime-water, and the solution is then to be filtered, to get rid of all extraneous particles, after which the mucilage is added: the proportions are as follow:

℞ Liquor. calcis ℔j.  
 Extract. opii ℥j.  
 Mucilag. acaciæ ℥ij. M. fiat lot.



much diluted; and he took the compound decoction of sarsaparilla. From the latter he thought he derived considerable benefit. By these means, and by attention to his general health, he effected a cure; but his life was in considerable danger from the irritable sore, produced by an apparently trivial accident.

*Sinuuous ulcers.*—Whenever a sore extends to any considerable depth, and the discharge has to travel through a channel before it arrives at the surface, such an ulcer is called sinuous. There are two reasons why these ulcerations are difficult to heal: first, from matter forming at its extremity, forcing its way through the passage, and thereby disturbing the healing process, by breaking down whatever adhesions and granulations form on its sides; and, secondly, the same interruptions occur from the actions of the muscles, when these ulcerations happen in muscular parts; thus, if the healing process has commenced in fistula in ano, when the sides of the fistula are at rest, the first time that the person has a motion, the sphincter ani, by its action, will destroy the newly-formed union; consequently, if the sphincter be divided and the parts have rest, granulations will form, remain undisturbed, and a cure be the result; and this clearly shows that the motions of the sphincter occasion a continuance of the evil.

Sometimes in these cases, to excite the adhesive inflammation, injections of tinctura lyttæ are used; it readily produces inflammation; adhesive matter becomes thrown out; and if you take care to keep the sides of the sinus in contact by these means, the parts will permanently coalesce. Sinuses of the rectum, however, are seldom cured without operation; indeed I have met with but two such cases; one was that of a gentleman who came from the north of England; he had been annoyed by a fistula on each side of the anus, and one of which was operated upon by Mr. Hey, of Leeds; he was cured on that side by the operation; but as it was attended with some loss of blood, the patient was too much frightened to be cut again, and he came to town for advice. I examined him, and finding that there was considerable space between the anus and the fistula, I advised him not to submit to an operation and said that I would try to relieve by injection. I injected first Port wine and water: this did not answer; it was not sufficiently powerful. Port wine alone was used, and succeeded in obliterating the canal. I was fortunate in this instance; for I can assure you, that fistula in ano is seldom, very seldom, completely cured without an operation. When you do not succeed by injection in sinuous sores, you may employ the caustic bougie. Still pressure will be necessary; and it is scarcely possible that you can succeed without it. When the fistula is very extensive, it may be divided into two; or a seton may be introduced, and kept in for a fortnight or three weeks, with a view of stimulating the parts, for the purpose of filling the cavity with granulations.

*Extraneous bodies.*—Ulcers are frequently formed for the discharge of extraneous bodies; when such substances become lodged,

therefore, in any part of the human frame, inflammation is excited, pus becomes secreted; which pressing towards the surface, ulceration succeeds, and the extraneous substance is thus afforded an opportunity of escape. Ulcers of very considerable extent arise from the exfoliation of bone; here you can assist nature by applications which act chemically on the parts; apply, for this purpose, a lotion composed of muriatic acid and water, or nitric acid and water: this wash will dissolve the phosphate of lime, or earthy matter of the bone, and whilst removing this inanimate substance, the action of the absorbents will be increased, and a quicker separation of the diseased from the healthy parts be the consequence. The acids, however, have not so great an influence in these cases as you might be led to expect; still, however, you will find them to be of use, and they should be employed.

*Irritation from the nails growing in.*—Ulcers, which occasionally form on the fingers and toes, are sometimes exceedingly difficult to heal, from an irritation caused by portions of the nails penetrating the integument. You may think this too trifling a subject to require a moment's consideration; but I can assure you it is far otherwise. A nail, for example, from pressure or some other cause, shoots into the skin beside it: a fungus springs up; the surgeon applies caustic, and destroys it; in a short time it rises again, the caustic is repeated, and the fungus disappears; it speedily, however, returns, and will continue to do so, notwithstanding all his efforts to the contrary, unless he remove the irritating cause; now this cause is the projecting portion of the nail: as soon as that is removed, or its pressure prevented, the fungus will cease to grow, and the ulcer immediately heal. The best modes to adopt for the purpose of radically relieving these troublesome affections are as follow:—Pare down the nail as thin as you can, without producing bleeding; then raise its edge a little and introduce between it and the sore a small piece of lint; in this way the irritation may generally be removed. It sometimes happens, however, that the sore is so exceedingly irritable, that even lint cannot be lodged on its surface without producing great increase of inflammation and pain; in such cases, what I do is this: with a pair of scissors I slit up the nail on the side where the disease exists, and then, with forceps, turn back, and sometimes completely remove, the divided portion. This is a very painful operation certainly, but I have known persons get well by this treatment in ten days, when the complaint had for months resisted every other. The applications to be used after the operation are of little importance: poultices are the best, and these will be required but for a limited period; for the irritating cause having been removed, the fungus will soon disappear.

The next plan to be adopted, for curing these cases, is the application of a blister; this brings away the cuticle, and often the nail with it. The most lenient method is the one first mentioned, viz. the introduction of a piece of lint. Mr. Hunter, in alluding

to this disease, said, that the parts were not in a state of harmony: this is very true, and a very proper expression; he also applied it to those cases where a disease in the gland producing the nail, causes the nail to turn black; such affections are not uncommon, and are often thought to be syphilitic, and I have frequently known persons salivated for them; this opinion, however, is perfectly erroneous: you must apply to the sore liq: calcis and calomel, and administer the pil: hydr: submur: comp: and decoct: sar-saparillæ comp:

\* Sometimes, in these cases, we apply a blister, then remove the nail; but often we are obliged to dissect out the gland that produces the nail; and though the operation is a painful one for the patient, yet we are, for the purpose of affording permanent relief, compelled to resort to it.

*Whitlow.*—Whitlow is an exceedingly painful swelling, terminating in an abscess by the side of the nail. The principle is this: the matter forms at first under the nail; but being unable to force its way through that horny substance, burrows under it, until it escapes at its edges, thus producing excessive pain and irritation. Fungous excrescences often arise in these cases, which induce the surgeon to apply caustic: this practice is worse than useless. You should, after fomenting or poulticing the part, remove a portion of nail; this permits the matter to escape, and instantaneous relief is the result.

*Menstrual ulcer.*—The next ulcer that I shall describe is the *menstrual*; I mean by this a sore which, once in three weeks or a month, secretes a bloody fluid. This complaint is connected with amenorrhœa. In visiting the hospitals, you must have observed that females on one day have their sores healthy, and probably on the next day they are covered with blood—in fact, the menstrual ulcer is a very common occurrence. You must apply to these sores liq: calcis and calomel; give the patient the mist: ferri cum myrrhâ and pil: hydr: submur: comp: an ounce and a-half of the former, twice or three times a-day, and five grains of the latter every night at bed time. These medicines will generally succeed in improving the state of the constitution, by restoring the defective secretions.

*Ulcers from varicose veins.*—The next ulcers which I shall explain to you are the *varicose*, from varicose veins; and I shall be particular in my description, as the subject is one of importance. The veins, in different parts of the body, often become varicose; but those of the lower extremities by far the most frequently so. This condition of the vessels arises from extreme distension, so that their sides are separated and their valves are incapable of approximating: the blood pressing in one uninterrupted column, the veins become distended and serpentine, and the valves widely se-

\* At the root of each nail a gland exists, which secretes the nail; and under the nail are laminae, into which the nail grows; and by corresponding laminae, in the under surface of the nail, it adheres with extraordinary firmness.



parated from each other; the heart and arteries, by their powerful attempts to return the blood, soon excite inflammation, and ulceration supervenes. The most common effect produced is, desquamation of the cuticle, the whole surface of the skin covering the diseased veins is formed into a crust, and under this a quantity of serum is secreted. The first thing to be attended to in these cases is the recumbent posture: in fact, this position is indispensable; you can do nothing without it. Lint, wetted by the black mercurial wash, should be laid on the ulcers, oil silk over these, and the limb should be well and regularly bandaged, beginning at the foot. The pressure allows the valves to recover their lost action, and consequently it will be found to be highly useful. Another great benefit is derived in these cases from opening the veins; indeed, they are so distended that they may more properly be termed lakes than rivulets. If you do not open the vessels, you will find considerable difficulty in the progress of the cure. The best plan that you can adopt is to puncture them by means of a lancet, twice in the week as long as you think they require it; let the bandage be afterwards applied, and the parts kept wet by means of evaporating lotion. No danger whatever attends the opening of these veins, and very great relief will be afforded by it. If the punctures, however, at any time should not unite, but fret into ulcers, you must apply to them liq: calcis and calomel. It often happens that persons, who, for a length of time, have had the veins of their lower extremities in a varicose state, will find a great quantity of blood in their shoe; the crust, before alluded to, coming off, is the cause of hæmorrhage, by opening the vein. Upon being called to a patient so situated, you may put him in the recumbent posture, apply a bandage, wet the part constantly with spirit of wine and cold water, and you will prevent any future bleeding.

Pregnancy is a frequent cause of varicose veins, and so is obesity.

It was formerly the practice, when the veins were in a varicose state, to tie and divide them. This plan is still pursued by many surgeons; but it is one that I have deprecated in my Lectures in this Theatre for this last eight or nine years; it is very injudicious, and fraught with great danger; therefore, let me exhort you never to adopt it. I have seen this operation prove fatal in several instances in these Hospitals; therefore I was induced to say that it must not be performed. A gentleman at Nottingham, informed me that he had tied the vena saphena, for a varicose state of the veins of the leg of a young farmer, in other respects healthy, and the operation proved fatal. The same lamentable catastrophe occurred to a most respectable practitioner at Brentford; and this gentleman told me, that he would not again perform the operation for the world. If I were to tell you all the cases in which I have known it terminate fatally, I should recount at least eight. Another overwhelming objection to the operation is, that when it does not prove fatal, its ultimate effects are useless. If I were asked which of the

following operations I would rather have performed upon myself, viz. the saphena major vein, or the femoral artery, tied, I certainly should choose the latter. When an artery is tied, the inflammation is confined to the neighbourhood of the ligature; but in a vein it is very extensive, the vessel becomes exceedingly distended, the inflammation uncommonly severe, and either extensive suppuration or mortification ensue, and death is the result.

Mr. Travers has written an excellent Essay on this subject, which well deserves your attentive perusal.

*Chronic carbuncle.*—Ulcers are sometimes occurring in the cellular membrane, which I call *chronic carbuncle*.

When the constitution is impaired, from any cause, it frequently happens that small swellings form under the skin. At first they are red, then purple, and ultimately slough. The ulcerative process is slow in these cases. A white substance will soon be perceived at the bottom of the sore, called vulgarly a core; and as soon as this separates, healthy granulations will form, and the wound become healed. Constitutional treatment in these cases is absolutely necessary: for unless you improve the general health, the ulcers will not heal. You should administer aperients, such as the infusion of senna, Epsom salts, &c. and give alteratives; the Plummer's pill will be found the best medicine. For females, where great general debility has given rise to the formation of these sores, no medicine can equal in power the carbonate of ammonia. I shall have frequent occasion to allude to this. I generally give it in the following form:

R. Ammon: carb: ℥ss.  
 Aq: menth: virid: ℥vss.  
 Tinct: cardam: comp: ℥ss.  
 M. ft. mistura.

If any one medicine improves the nervous system when deranged more than another, it is this. I have often prescribed it for females when in a state of extreme weakness, and its effects are truly astonishing: three table-spoonfuls of the mixture may be taken two or three times a-day. If the poultices have not the effect of exciting the granulating process, you may wash the sores with the liq. calcis and calomel lotion, or gently touch their surface by means of the nitrate of silver. This state of the cellular membrane often accompanies amenorrhœa, and then the mistur. myrrhæ ē ferro, and the pil: hydrarg: subinur: comp: are the best medicines.\*

*Cutaneous ulcers.*—It not unfrequently happens, that the skin in various parts of the body falls into a state of superficial ulceration, producing *cutaneous ulcers*. The best applications in these cases are, the yellow wash: ungt: hydr: nit: or the ungt: zinci oxydi.

\* The cure in these cases is much expedited by making a free incision through the swelling; as it allows the core, or dead cellular substance, to escape, without which the ulcer cannot be healed.—T.

The internal use of the oxymuriate of mercury will likewise be found particularly beneficial and salutary; give it in the formula mentioned in a previous lecture, viz. in conjunction with tincture of bark; a small quantity of this mixture should be taken in a little white wine, once or twice daily, according to the age and symptoms. This medicine will be found a very valuable one, when the above-mentioned ulcerations are connected with disease of the glandular system.

*Noli me tangere*.—There is an ulcer often existing on the face, called *noli me tangere*. This disease has never been correctly described; the truth is, that it is an ulceration of the glands, or follicles of the nose, those small cavities from which you can squeeze sebaceous matter; the ulceration extending deeply, at last even the cartilages of the nose become destroyed. The plan of treatment to be pursued in this case, is as follows: you must prepare an ointment, according to the following prescription:

℞. Arsenic oxyd.  
Sulphur flor aa ʒj  
Ungt cetacei ʒj  
M. fiat unguentum.

Apply some of this ointment on lint, to the ulcer, and leave it there for twenty-four hours; and then remove it, a slough will separate: dress the ulcer with some simple ointment, or a poultice, and in a short time it will generally heal. If the ulcer is not deep you may cure this complaint without using the arsenical preparation, by painting the surface of the sore daily with a solution of the nitrate of silver.

You must be cautious, however, in your manner of using this application. A gentleman once came to me with an ulcer of the kind of which I am speaking, and which I painted in the manner described with a camel's-hair brush. In the course of the day, when at Lloyd's, he was asked by some friends what was the matter with his nose, for they told him it was quite black; and, in fact, it was so. I was not aware, at the time, that a solution of the nitrate of silver would have produced that effect; and I merely mention the circumstance, that you may be on your guard. The nitric acid is a good application, diluted according to the irritability of the part, and the liq. calcis c̄ hydrarg: oxymuriat: produces a good effect.

Deep ulcers, having a malignant aspect, often remain in the face of old persons, without destroying life, although, from their appearance, they portend the most direful effects. To such sores the best application is, the arsenical ointment.

*In gouty habits* ulcers frequently form on joints, arising from inflammation caused by a deposition of the urate of soda. Persons sometimes apply with many joints open from this cause. A gentleman came to me from the country thus circumstanced: several of the joints of the toes were quite exposed, and the cartilages of



some of them absorbed. I found in each of these joints a portion of the urate of soda; therefore, when it is necessary, you increase the openings through the skin, and remove the urate of soda, that being the exciting cause of the disease. It is curious how little irritation is produced in the parts when thus affected, for this gentleman walked to my house.

*Ulcers with thickened edges.*—Occasionally the *thickened state of the edges of ulcers* impedes the healing process. These edges must be adapted to their surfaces, and this may be done by means of the empl: galban: comp: which will remove the indurated cuticle, and stimulate the parts to action; if this, however, should not succeed, you may use the ungt: hydr: fort: or ungt: lyttæ, or you may with a lancet scarify the edges, and this method will often succeed, when every other fails. A blister has an excellent effect.

*Ulcers with inverted edges.*—The edges of sores are sometimes very *much inverted*: a constitutional, as well as local treatment, is then necessary. With respect to the local, the application of nitrate of silver to the edges, and the black mercurial wash to the surface of the wound, is generally all that will be required, and the alterative medicines I have so often mentioned to you must be regularly given until the ulcer heals.

*With everted edges.*—Some sores have their edges very *much everted*, and this affection is commonly symptomatic of a malignant diathesis. The usual method of treatment practised in these hospitals is, to poultice such ulcers; to attend particularly to the condition of the general health, until it is possible the edges have resumed a natural and healthy state.

Thus have I passed over in review the various modes of treatment required for sores in different states; but when it is a simple ulcer only, the admirable mode recommended by Mr. Baynton, of applying straps of adhesive plaster, should be had recourse to; which, by stimulating the surface, approximating the sides of the wound, and thus facilitating the processes of granulation and cicatrization, surprisingly contributes to complete the healing process.

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## LECTURE IX.

### ON GANGRENE.

HAVING traced inflammation through its adhesive, suppurative, and ulcerative stages, I shall now proceed to consider it in its most destructive form; namely, when it exists in such excess as to produce gangrene.

We find that when inflammation is extremely violent, it occasions the destruction of the vital power of the part. At other times, when there is a less degree of inflammatory action, but the

powers of the part are feeble, life will still be destroyed; so that gangrene is produced either by an excess of inflammatory action, where the powers are natural, or by a less degree of inflammation, where the powers of the part are feeble.

*Definition.*—Gangrene may be considered as a partial death: this is its definition: the death of one part of the body, while the other parts retain their natural powers.

*Symptoms of Gangrene.*—The symptoms of gangrene differ according to the manner in which it is produced. When it is the result of high and active inflammation, the pain attending its production is exceedingly severe; the inflammation is very extensive; there is a blush on the surrounding skin; and generally, though not always, a considerable degree of swelling. The secretion from any sore which may exist ceases, the surface of the skin becomes of a purple colour prior to its death, but afterwards is rather of a brownish tinge. The cuticle is raised; a vesication is produced; and when this breaks, it is found to contain a bloody serum. When the serum is discharged, the skin assumes the gangrenous appearance, and becomes perfectly insensible. The vesications extend to parts beyond the ulceration: thus in sores of the leg we frequently see a large portion of the skin giving way, and the gangrenous vesications extending beyond the ulcerated surface.

*Constitutional symptoms.*—The constitution suffers considerable derangement from gangrene; there is a high degree of irritative fever, and the pulse is often exceedingly quick; it is generally said to become slow when gangrene takes place; but I have never observed this. I have indeed occasionally remarked but a few beats in a minute, because it is very frequently intermittent; still the pulse is quick: it is said also to become soft, but I should not say that this is the character of the pulse in gangrene. It is quick, very small and thready, and generally irregular.

*Delirium and hiccough.*—Gangrene seldom occurs without delirium, and it is attended also with vomiting and hiccough. Hiccough, indeed, is the characteristic sign of gangrene, and it takes place though the gangrene may be situated in a part very distant from the stomach; as, for example, in the toe. The fact is, that when gangrene arises from a diseased state of the constitution, the stomach is extremely disordered, and its derangement is followed by spasmodic contraction of the diaphragm, producing hiccough. This symptom does not arise from any direct action on the diaphragm, but from its sympathy with the deranged state of the stomach. If you wish to correct hiccough, you may arrest it for a time by giving some slight stimulus, or even by adopting opposite means. Thus a glass of cold water will suspend it for a considerable period. Such are the symptoms when gangrene is the result of excessive action.

*Gangrene from feeble action.*—Gangrene is sometimes the effect of a low degree of inflammation; as when it is produced by the

application of cold, if a great degree of cold is applied to any part for a considerable time, the part will become benumbed; that is, its nervous power will be diminished; and when it is thus enfeebled, it will be unable to bear a very slight degree of supervening inflammation, and the destruction of its life will follow. In this climate, however, destruction of the life of the part does not, in general, immediately succeed. A person will come to the hospitals with his feet benumbed; he may have been wandering about the streets, unable to find a place of refuge, exposed to severe cold. Great care must be taken in these cases not to apply heat very suddenly; even the common heat of the bed frequently occasions inflammation, which is extremely liable to gangrene, in consequence of the diminished nervous influence of the part. I knew a gentleman of the first consequence in this country, whose death occasioned, perhaps, as much regret as that of any one who has died for many years, who lost his life from an act of imprudence. He had been shooting, and had exposed himself to severe cold; and finding his feet benumbed on his return, he immediately put them into warm water. The consequence was, that a gangrene took place, of which, notwithstanding every care, he died. In this climate it generally happens, that inflammation succeeds the application of cold after an interval of two or three days. By the use of some slight means of treatment, this inflammation is generally suspended; and it is by the repetition of the inflammation, rather than by its severity, that the powers of the part become, at last, exhausted. In colder climates than our own, that part exposed to cold becomes white, and the suspended circulation is commonly restored, by rubbing the part with snow. If it be not very carefully treated, however, inflammation and sloughing are apt to ensue. If a part be completely frozen, inflammation frequently ensues in a short time, and after continuing for a few hours, is followed by a destruction of the vital power.

These are symptoms which we observe in cases where gangrene is the result, either of a high degree of inflammatory action, or of diminished powers. When gangrene is produced by either of these causes, the process of separation soon commences; this is one of the most curious which occurs in the human body. There is nothing more extraordinary to my mind than the power which nature possesses of separating even large members without any hæmorrhage, and with little danger to life. There is an instance at the present time, in the other hospital, in a case of popliteal aneurism, which will afford you an opportunity of judging of this process of separation for yourselves.\*

*Separation of the skin.*—The first appearance which we observe after the destruction of the life of any part, is a white line which nature forms for the separation of the dead from the living parts;

\* This man's leg has separated through the calf.



for this white line we anxiously look, since it is the barrier which nature sets up between the dead and living parts, and it becomes a criterion of the cessation of the gangrenous disposition. At this white line the cuticle is raised. This elevation of the cuticle is, a vesication which forms a line of circumvallation around the gangrene. When the cuticle becomes separated, as it will in two or three days, we find a chasm beneath it produced by the absorption of the living skin, which was in contact with the dead. The living skin is taken up by the absorbent vessels into the constitution, and in this manner the dead parts are separated by a process of nature. If we were to reason, *à priori*, on this subject, it might be expected, that the absorbent vessels would rather remove the dead portion of skin in contact with the living; but this is not the case. The absorbent vessels act on the living parts, and not on the dead; nor is the dead skin absorbed after the granulations have formed, but it becomes loose, and ceases to attach itself to the surrounding parts; the chasm formed by the absorbent vessels causing separation.

*Separation of cellular tissue.*—The next part which begins to separate is, the cellular tissue immediately under the skin. Gangrene proceeds to a much greater extent in the cellular tissue than in the surrounding skin, because the cellular membrane is a part of weaker living powers. It is for this reason that a sloughing disposition is so dangerous in sores extending to the cellular membrane. A small chancre beginning in the pudendum of the female, or in the prepuce of the male, will frequently occasion the destruction of life in the part. Persons have absurdly supposed, that these sloughing sores are not chancres, because they have not the common venereal character. How does this happen? if a chancre form in the pudendum of an irritable female, and has a sloughing disposition, it extends into the cellular tissue, inflames it to a high degree, and produces gangrene. In this manner the character of the chancre becomes destroyed. There is, at this time, an unfortunate female (only seventeen years of age) in the other hospital, who has lost a considerable portion of the external organs of generation, in consequence of a sloughing chancre. The hospitals teem with such cases; and indeed this deplorable result is frequent when a chancre extends into the cellular tissue, a part naturally weak, and rendered weaker in these persons from their irritability and mode of life.

*Separation of muscles.*—The next part that separates is, muscle. Muscles separate nearly opposite the edge of the skin. Wherever the skin separates, the muscle gives way; a line of separation is formed, and the living portion of muscle is removed from the dead. This is not the case with tendons; these, like the cellular tissue, do not separate opposite the skin, but at a considerable distance from the part at which the sloughing happens. If a tendon be exposed in the palm of the hand, by a sloughing ulcer, it sepa-

rates near the wrist; for it is incapable of resisting the inflammation, in consequence of its weak living powers, and separates, therefore, at the part where it joins the muscle.

*Separation of nerves.*—The nerves separate, like muscles, opposite the skin; but the most extraordinary instance of the process of separation is, that which takes place in the larger blood-vessels. What would be the result, if the anterior and posterior tibial arteries were cut, without placing a tourniquet on the limb? the person would die in a few minutes. Yet nature frequently divides the arteries I have mentioned, without any blood issuing from the limb. This happens in the following manner: The blood in the vessels of the dead part becomes coagulated; the coagulum, however, does not confine itself to the dead part, but extends to the living vessels which join it, and is, in this manner, glued to the inner side of the artery by the adhesive inflammation; so that the vessels are, as it were, hermetically sealed; and not a drop of blood can escape by the side of the coagulum. The same thing takes place in veins, the coagulum adhering to the inner side of the living vein, so that no blood can escape. If you amputate a limb at a considerable distance from the part at which gangrene has commenced, you will still find the vessels sealed. The first amputation which I ever performed, was in the case of a person who had a gangrenous ulcer near the head of the tibia. In this case it was necessary to amputate above the knee, as sufficient skin would not have been left if the amputation had been performed below. When I loosened the tourniquet, I was surprised that the femoral artery did not bleed. On a closer examination I found that the inner side of the femoral artery was completely sealed by the coagulum which had extended, at least, six inches above the place at which the gangrene had occurred. It appears, therefore, that the artery is not only sealed at the place at which nature divides it, but at a considerable distance above it, in order to provide against the danger which would arise from a separation of the coagulum.

*Separation of bones.*—Bones, at last, become separated; but this process is very slow, loaded as they are with phosphate of lime. Hence we are often under the necessity of taking away bones, when the process of separation is, in other respects, complete. I am anxious, whenever I have an opportunity in these lectures, to refer you to cases actually existing in the hospitals; and you cannot have a better opportunity of observing the process of nature with respect to the separation of bones, than in the case of popliteal aneurism, to which I have before directed your attention.—This man underwent the operation for aneurism in the other hospital. The aneurism bag had been loaded with fluid blood for a length of time; the process of gangrene commenced at the ankle, all the soft parts were absorbed, and there is nothing now remaining but a portion of bone, which will also separate, if we permit

it to do so, by the efforts of nature alone. I knew a person in the country from which I came (Norfolk), whose leg entirely separated by the process of ulceration. In the foot this very commonly takes place; in the calf of the leg it is not common, but below the calf it frequently occurs. I attended one of the King's messengers some time ago, who came from Germany with a gangrene in the foot. The foot separated at the tarsus, and the whole process went on without any surgical operation, and nothing but the aid of the simplest applications.

*Gangrene the effect of debility.*—Gangrene is frequently the effect of a debilitated state of the constitution. Thus if a man has been confined by a long continued fever, the nates are apt to slough, and become gangrenous, in consequence of the imperfect circulation, arising from the position in which he has been forced to remain. Some fevers have a greater tendency than others to produce gangrene; as, for example, scarlatina.

In slight cases of scarlatina, the most horrible effects will sometimes arise from gangrene. The tonsils slough to a great extent; parts of the eustachian tube, and even of the tympanum, will separate, and large portions of bone exfoliate. The worst effects of this kind are observed in those cases of scarlatina, in which the fever is not the most violent. The measles are very apt to be followed by sloughing. In this town it sometimes happens, that a large blister applied to the chest of a child labouring under measles occasions a high degree of inflammation, producing gangrene, and endangering the life of the patient. In constitutions of an unfavourable kind, I have seen the measles produce a slough, forming an aperture through the cheek of the child, by which its food escaped, and life was soon destroyed. Mercury, if used to excess, often excites sloughing, from the fever, and consequent debility of the constitution which it produces. Whatever, in short, weakens the constitution much, disposes it to the production of gangrene; for the body, when thus debilitated, cannot bear any excess of action.

When the application of cold is the cause of gangrene, the effects are produced very much in the same way. The powers of the part, to which the cold is applied, are diminished, and this diminution of power leads to the destruction of the part, under the first excess of action.

There are also some parts of the body naturally constituted feebly: as, for example, tendons. When inflammation attacks a tendinous structure, it runs very readily into a state of gangrene. Hence the danger of making incisions into tendons; the inflammation which follows affects the nervous system with the highest degree of irritability, and produces tetanic symptoms. It is not the injury to the nerves which produces tetanus, but sympathy with the injury to the tendon.

It may be stated, as a general principle, that inflammation is



the cause of gangrene. Gangrene very rarely happens without inflammation; but as there are some exceptions to this general principle, I will mention them.

*Gangrene not the result of inflammation.*—I have seen, in a case of hydrothorax, a small spot on the leg become at once black, without any appearance of inflammation, and extend itself until it occupied a very large surface. Here the total absence of circulation, and not an increased degree of it, occasioned the destruction of life in the part. So we now and then see aneurism producing gangrene. In the case of popliteal aneurism, to which I before adverted, the gangrene is produced, not by the bursting of the aneurismal bag, but by its pressure on the vessels, occasioning the destruction of life in the limb below. I saw a gentleman, a few months ago, who appeared upon the point of death from the pressure of a popliteal aneurism. His foot afterwards became gangrenous. He did not die, however; for a separation of the foot, and part of the leg, followed, and he ultimately recovered. Thus it appears that impeded circulation, without inflammation, is sometimes a cause of gangrene. The division of a considerable blood-vessel will produce the same effect. A person was stabbed in the groin by a foreigner, with a dirk or sharp knife, which penetrated the femoral artery; considerable hæmorrhage took place, which was stopped by a ligature on the artery; but the leg afterwards became gangrenous, and it was necessary to amputate the limb.

Since I commenced these Lectures, I have seen a most melancholy instance of a gentleman, in the prime of life, who died from gangrene, in consequence of an injury to the femoral artery. This gentleman was thrown from a gig as he was going down a hill, and the wheel of the carriage went over his thigh. When he was taken up, it was found that he had a simple fracture of the femur. Every thing which attention and skill could do for him was done; but some peculiarities were observed at the time of the accident. The lower part of the leg was quite insensible; it was considerably swollen, and hard. After lying in bed for a week, the patient became so restless that he wished to be removed. This was done in the gentlest possible manner. He did not, however, experience the relief which he expected from a change of position, and the swelling was in some degree increased. I was then sent for; and when I saw him was surprised to find that gangrene had already commenced at the knee. This was hardly to be expected from a simple fracture; for it so rarely happens that the femoral artery is injured by a fracture of the thigh bone, that amidst all the cases of fractured femur which I have seen, I never witnessed one in which the artery was injured. However, from the immediate insensibility of the limb at the time of the accident, from its coldness, from the swelling which accompanied it, and also from the pulsation which existed opposite to the fracture, I was led to believe that the femoral artery was torn through. The question then arose whether we

should amputate. Upon examination, I found the limb emphysematous; the air had extended into the cellular tissue up the thigh to the abdomen, and putrefaction had already commenced. I perceived, therefore, that the patient had but a few hours to live, and that it was useless to put him to the pain of an operation. Upon examination after death, by the medical gentlemen at Rochester, where the patient resided, it was ascertained that the femoral artery was divided. It seems extraordinary, when we contemplate the situation of the thigh bone, with respect to the artery, that a fracture of it should not in one case in ten produce a similar result. A little knowledge of anatomy, however, explains this circumstance. The artery is enclosed in a sheath, which so far protects it; and its elasticity yielding to the pressure of the bone, enables it to escape in a great majority of cases from being injured by this accident.

*Nature of gangrene.*—The nature of gangrene, as far as dissection enables me to judge of it, is this: the excessive action of the part kills the blood-vessels, and the blood contained in dead vessels becomes coagulated.

This is a curious circumstance, which I ascertained by an experiment made on an animal. It is a well known fact in physiology, that if a quantity of blood be included in a living vessel between two ligatures, at the distance of two or three inches, this blood remains rather more than three hours before it becomes coagulated. To ascertain whether, if blood were admitted into a dead vessel, from which the air was entirely excluded, it would coagulate as it would out of the body, I put a ligature on the jugular vein of a dog, another ligature at a distance of two inches from the first; then cutting through the vein, I brought it externally to the skin, so that it hung out from the wound for six hours. Having ascertained that the blood coagulates in three hours and a-quarter, in a living vessel, I took off one ligature from the dead pendulous vessel, and found that in ten minutes the blood had coagulated as firmly as it would in a cup into which a person had been bled. In a dead blood-vessel, therefore, the blood becomes coagulated as it would in a vessel out of the body. If you attempt to inject a part after gangrene, the injection will not enter the vessels. There is a specimen on the table of a gangrenous limb, where you may perceive that the injection has entered only as far as the part at which gangrene has commenced. Such is the state of parts under gangrene. They can never be recovered, because blood cannot again circulate in their vessels.

#### TREATMENT OF GANGRENE.

We shall now proceed to consider the treatment which is to be employed to prevent gangrene, and to assist the sloughing process.

*Local bleeding.*—You must endeavour to soothe the inflamed parts by the application of leeches, with a view of checking the

excess of action. It generally happens, in these cases, that the body will not bear any considerable degree of depletion; but local evacuations, by leeches, may be safely resorted to. Thus, in compound fracture of the leg, gangrene may be prevented by the application of leeches, when it would not be equally safe to take blood from the arm. Soothing applications, such as poppy fomentations, and poppy poultices, should be applied to subdue the excessive action, which threatens destruction to the life of the part. It will be necessary, at the same time, to attend to the constitutional treatment of the patient. In this metropolis it is seldom safe to take blood from the arm to prevent gangrene. In the country, a different practice may be pursued; and it will frequently be necessary to take away blood in erysipelas, and other cases, in which we cannot and dare not deplete in London, the constitution of the patient being broken by intemperance, or enfeebled by impure atmosphere. When you take away blood, however, to prevent mortification, do not remove more than eight or ten ounces, lest the vigour of the circulation, and consequently the nervous powers of the constitution, should be too much diminished.

*Constitutional remedies.*—Two or three grains of submuriate of mercury should be given at night, with a view of restoring the defective secretions of the intestinal canal and the liver; and the liquor ammoniæ acetatis, with a few drops of the tincture of opium, should be given several times in the day. By the calomel you restore the secretions; and by the opium you tranquillize the system, and diminish the irritability which leads to the destruction of the life of the parts. Do not begin by stimulating the constitution too much in cases of gangrene. The effect of opium may, in some respects, be similar to that of taking a stimulus into the system; but it is by diminishing the quickness of action, and thus increasing the strength of the body, that opium becomes so valuable a medicine in these cases. The best means, therefore, of preventing gangrene, are to restore the secretions; to diminish irritability by opium; and, in some cases, to take away very small quantities of blood.

*Treatment of benumbed or frozen parts.*—If the gangrene arise from the application of cold, the treatment must be different. In these cases, the action of the parts is feeble from the diminution of nervous power, and it will be proper to restore it to a healthy state by stimulants of the most gentle kind. The principle in this case is, to stimulate gently, but to moderate the stimulus by evaporation.

For this purpose the best application is the camphorated spirit of wine, accompanied by gentle friction. If you are called to a patient whose feet are benumbed by the application of cold, you must sit by his bed side, pour the camphorated spirit into your hand, and rub it on his feet with the utmost possible gentleness, so that the part may not be irritated by violent friction. When the first effects of cold are removed, it will be proper to apply poultices to the part. The poultices must be cold, for warm applications are to be carefully avoided. One of the most valuable of our



nobility died of gangrene from an imprudence in this respect. He was out shooting in December last, and his feet having become benumbed, he put them into warm water as soon as he returned home. The consequence was, that his toe became gangrenous; gangrene also occurred in the other foot, and he died from its effects. When parts are frost-bitten in colder climates, you are aware that the common practice is to restore the circulation by rubbing them with snow. The friction is a stimulus, which the melting snow moderates.

*Treatment when gangrene has commenced.*—But so soon as gangrene has commenced, it will be necessary to apply a gentle stimulus, with a view of supporting the action of the surrounding parts which are threatened with the destruction of life. The application which is found to be most uniformly successful in such cases, is the poultice of stale beer grounds mixed with oatmeal; a poultice, thus formed, will produce a gentle and beneficial stimulus to the part, and prevent the gangrene from spreading to the surrounding skin. Spirituous fomentations are also of use for the same purpose. At the time that this local treatment is employed, means must be taken to support the constitution, which is debilitated by excessive action. The best mode of producing this effect is by the exhibition of ammonia united with opium. Seven to ten grains of the carbonate of ammonia with twenty drops or half a drachm of the tincture of opium, should be taken two or three times a-day, or even every four hours. This plan will generally prevent the extension of gangrene. Bark was formerly extolled, as possessing great virtue in these cases; but it is doubtful whether it does not do as much harm as good. For the first two or three days the patient's health appears improved by its exhibition; but, after a short time, his stomach becomes loaded and oppressed: it first makes him costive, and then purges; and after a little time we are obliged to suspend its use. I am much disposed to try, in these cases, the new form of that medicine, which agrees so well with the stomach; I allude to the sulphate of Quinine. It is my intention to give it a full trial in the first case of gangrene which I meet with; and I recommend you to try it yourselves in those cases which may come under your observation. An excellent medicine used in the other Hospital, is a bolus, of five grains of the carbonate of ammonia with ten grains of musk, given every four hours. I have seen this medicine produce the best effects in sloughing sores in the foul wards, and in cases in which the gangrene was much disposed to spread. The musk has the effect of keeping up the stimulus of the ammonia, which is apt to subside after a few hours, when the ammonia is exhibited alone. We find that a change in the local remedies is often required. A port wine poultice is an admirable application in these cases. I mentioned to you, a few days ago, the case of a girl, in the other Hospital, who had a gangrenous sore in the pudendum, where a great variety of applications had been tried without any beneficial result. At last a Port wine poultice was applied,

and with such immediate good effects, that, though I had before despaired of her life, the last time I saw her, the sore was brought into so healthy a state, that there are great hopes of her recovery. Applications of turpentine also are often of use in these cases, for the purpose of stimulating the parts.

After great want of circulation in any part, from the course of the blood having been arrested, sloughing sores are very apt to occur. Thus, after the operation of tying the femoral artery, if the limb be suffered to rest in the same position for a considerable time, a small gangrenous spot frequently appears upon the heel. In such cases, the spirit of turpentine is the best application. Yeast is often applied with advantage. An application much used in Guy's Hospital for this purpose, is the formula which used to be called the epithema lithargyri acetatis; but now the epithema plumbi subacetatis.

The following is the mode of preparing it:

℞. Donfect: ros: ʒj.	
Mel rosæ	
Tinct: opii āā	
Liq: plumbi subacet:	} ʒjj. M.

This is an application which accords extremely well with limbs in a state of gangrene, when the dead are separating from the living parts. During the sloughing process, the nitric acid is upon the whole the best application that can be used: when the gangrene stops, and the line of demarcation is drawn, and the sloughing process is commencing, the nitric acid may be employed in the proportion of fifty drops to a pint of water. I have seen very good effects from an application composed of vinegar and the camphor mixture; about four ounces of the former to twelve ounces of the latter. This was of service when no other application had succeeded, in the case of a gentleman at Peckham, whom I attended with Mr. Arnould. These are the different modes of treatment for the prevention of gangrene, and to assist the sloughing process.

*Propriety of amputating.*—As to the propriety of amputation in these cases, there is sometimes no occasion for amputation in gangrene when the sloughing process is proceeding favourably, as you have an opportunity of seeing, in a man in the other Hospital, in whom nature has performed the operation herself, without any assistance; if the surgeon will be content to wait a short time, and the patient be so disposed, you will find that the parts will separate without an operation. Nature adopts the very plan in her amputations which the surgeon pursues; the skin separates the longest, the muscles next, and then the tendons, together with the bones, which are left considerably shorter than the other parts, as you may observe from the specimen on the table; the bones become covered by the skin, and the muscles surround the extremity of the bone. The cases in which you are required to perform the op-

ration of amputation are those in which the patient is unable to sustain the constitutional derangement produced by the process of separation; but when the constitution is strong, the patient will bear the process required to separate the limb. You have an opportunity of seeing in the other Hospital at present, in the case to which I have so often alluded, separation taking place above the centre of the leg; there is no absolute necessity to amputate under such circumstances, and you can give the patient a chance of his life without resorting to it. In constitutional gangrene, as a general principle, do not amputate till the sloughing process has commenced, and healthy granulations are to be seen on the sore; for, if an operation be performed, the stump will assume the same appearance and become gangrenous. It is curious to see how the loss of a slight quantity of blood will destroy life in these cases. When I was a dresser at these Hospitals, during my apprenticeship, there was a case of sloughing opposite to the calf of the leg; Mr. Cline, my old master, on going round the wards, said to the dresser, that the projecting ends of the bone had better be removed; there were some granulations between the bones, which, in sawing, the dresser did not observe, and he cut through them; a slight hæmorrhage ensued, and in the same night the patient died. —There was a case, in the other Hospital, in which the operation of amputation was performed; gangrene existed on one foot, a slight gangrene on the nose, and on the other foot: the leg was amputated; but the gangrene spread on the nose and foot, which before the operation, were only slightly affected. Amputation, then, should never be performed till the constitution be in an improved state, and healthy granulations have appeared.

*Gangrene from accident.*—But, with respect to gangrene from diminished action, or accident on some important vessel, amputation may be performed without hesitation. A girl was brought to Guy's Hospital, who, in endeavouring to reach something from a chimney-piece, trod on the fender, which turned over and she fell on its edge: a compound dislocation of the elbow joint, together with a wound of the brachial artery, were produced; the vessel was tied by the dresser; hæmorrhage was arrested; gangrene soon after appeared on the fingers, hand and fore-arm; when, nine days from the accident, the operation of amputation was performed above the elbow-joint, and the patient's stump was perfectly healthy. A man was brought to Guy's from Woolwich with popliteal aneurism; the aneurism had acquired great size; a gangrenous state of the limb below forbade the ligature on the artery, and amputation was performed. Before the operation, the pulse was from a hundred and twenty to a hundred and thirty: in the evening, after the removal of the limb, I sent Mr. Callaway, who was my apprentice at that time, to see how the patient proceeded: he found that the pulse had fallen to ninety; and no amputation that I ever performed ended more favourably. Under such circumstances,



amputation, instead of increasing the irritability of the constitution, by removing the cause of irritation, becomes the means of preserving the life of the patient.

#### OF GANGRENE IN OLD PERSONS.

*Cause of gangrene.*—We often find old persons afflicted with gangrene, from very slight causes; the action of the heart being naturally weakened by age, the circulation becomes extremely languid in the feet, and mortification of the toes ensues. The appearances which the parts assume are these; at first it is red and painful, slight pressure empties it of its blood, and some time elapses before it recovers its colour; the person, little alarmed, puts upon the affected part a piece of linen; in a few days the part is purple, the cuticle comes off, and there issues from the surface a sanious discharge; red streaks are now seen passing from different parts of the foot up the leg; and the glands in the groin often undergo considerable inflammation and enlargement; many of the absorbent vessels of the foot and leg becoming inflamed, produce universal redness of the diseased member. Soon after this the gangrene begins to extend, involves the whole of the foot, and passes to the lower part of the leg, where it usually stops, as it seldom reaches the thigh; the constitution becomes considerably influenced; there is some degree of fever, and the cheeks are of a fixed, florid red. This gangrene does not always destroy life, if attention be paid to the patient. It often arises from ossification of the arteries, not so much of the large vessels, as of the small. These losing their elasticity, combined with a debilitated action of the heart, give rise to the disease of which I am now speaking. The earthy matter sometimes is deposited in great quantities in large vessels, and here is a preparation where the deposition of earthy substance had rendered the popliteal artery impervious.

*Cases.*—I recollect some time ago a very intelligent surgeon (Mr. Steele of Berkhempestead) telling me, that he thought a certain nobleman whom he was at that time attending, had ossification of the arteries of the leg, from the pains of which he complained under exercise, and that it would some day give rise to gangrene. Of which his lordship has since died.

Where ossification of the blood-vessels exists, very slight causes will give rise to gangrene. A gentleman of the city, in cutting a toe nail, carried the knife too far, and cut the quick, as it is termed; the wound soon became gangrenous and black, and in the sequel he died. I attended a gentleman, an old surgeon, who, for the purpose of getting rid of a bunion, had (most foolishly) put a lancet into it. Gangrene followed, and he died. I was lately sent for by Mr. Holt, surgeon, of Tottenham, to a gentleman who, when cutting a corn, had carried the incision so deep as to produce bleeding; gangrene succeeded, but this gentleman recovered.

Old persons must, therefore, be cautious; for life being almost exhausted, very little will extinguish it.

*Treatment.*—With regard to its *treatment*, a poultice, composed of port wine and oatmeal, or of stale beer grounds, will be found the best *local* application; and the *internal* remedies should consist of opium, combined with ammonia. You must not expect that these cases will generally recover. I have known, however, a single toe, all of them, and even a portion of the foot, slough, and yet the patient do well. In these cases you must not amputate; whether there be healthy granulations or not, do not amputate; for as surely as you do, mortification of the stump will supervene, and death quickly ensue.

The next subject of which I shall speak, is

#### CARBUNCLE.

Of this I shall have but little to say, as many of the foregoing observations are equally applicable to this disease.

*Symptoms of carbuncle.*—When carbuncle is about to be formed in any part, it is generally proceeded by pain, by a swelling of considerable extent and hardness; this is occasioned by the adhesive inflammation; the surface of the tumour next assumes a livid redness, and a spongy feel; little ulcers now form in the skin, which, from their number, give it a seive-like appearance, so numerous are the orifices; from these a white discharge passes—this fluid resembles water and flour mixed together; and he who has seen much of the carbuncle, knows the nature of the disease instantly upon seeing these orifices, and the kind of discharge which issues from them. When the little openings are all formed into one, the dead cellular membrane becomes exposed, and begins to separate, having been previously confined by the smallness of the apertures. In gangrene of the extremities, there is not this mechanical obstruction to the sloughing of the dead part. And though gangrene is generally difficult of cure, yet carbuncle usually does well, except when situated on the head or neck. Though persons recover from carbuncles of an enormous size upon the back, yet very small ones on the head or neck will often destroy; indeed I never saw a patient who recovered from any considerable carbuncle upon the head; in these cases there is effusion upon the brain, producing compression. The inflammation which attends fistula in ano will sometimes destroy the cellular membrane of the neighbouring parts, thereby occasioning an enormous quantity of the nates to slough, and yet the patient recovers.

*Treatment of carbuncle.*—The peculiar treatment of carbuncle consists in making upon the surface of the swelling, at an early period of the disease, a large crucial incision, for the purpose of affording the dead parts an opportunity of escaping; then apply the Port wine poultice, and give the patient such stimulants as will

tend to increase the vigour of his constitution; and here we shall again find opium and ammonia our most propitious remedies.

#### OF ERYSIPELAS.

There is something peculiar in this inflammation; and as it is much disposed to produce gangrene, I will here introduce this subject to your attention.

*Its seat.*—Inflammation of the skin is generally extensive, in consequence of the surface being unbroken; so that when erysipelatous inflammation invades the skin, it is not uncommon to see it run from one part to another till half the body is covered by it. Sometimes it is ushered in by fever, and sometimes not. Certain constitutions are sooner affected by it than others, and often its effects appear to be entirely local. But unquestionably it is more frequently constitutional than otherwise.

*Characteristic marks.*—Its characteristic appearances are, a florid skin, with vesicles, containing a secretion of an amber colour. It is seldom that the skin suppurates in these cases; the cellular membrane, however, occasionally does. It is very common for erysipelatous inflammation to terminate in gangrene. You must not consider all cases of inflamed skin erysipelas. I have often seen cases treated as such, which were only inflammation of the skin, sympathetic with wounded absorbents, and tendinous aponeurosis. In the dissection of a person who died of erysipelas in the arm, the cuticle was separated, the skin was filled with blood, and was much thickened; the cellular membrane immediately under the skin was loaded with serum, and so was that membrane in and between the muscles to the bone.

*Of frequent occurrence on the head.*—The head seems to be more commonly affected by it than any other part: it often succeeds the most trifling injury of the scalp; and, like carbuncle, when it occurs in this situation, generally destroys life. I had the misfortune to lose a lady of considerable consequence from its effects, after the removal of a small encysted tumour from the head. It made its appearance three days after the operation, and all the skilful attention of Dr. Baillie was unable to arrest its progress. Thus a trifling operation on the scalp destroyed life, in consequence of having been succeeded by erysipelatous inflammation.\*

After a person has once had this disease, he is very subject to repetition of it; and some persons appear to be much predisposed to its formation.

It generally makes its appearance in spring and autumn, but rarely in winter, and not often in summer. Whatever renders the body irritable, predisposes to erysipelas. The slightest causes produce it after operations at certain seasons, and in particular states

\* As I shall hereafter more particularly mention, I have some doubts whether inflammations on the head following slight wounds are truly erysipelatous or not.



of the constitution: for it has often happened that the stimulating effects of adhesive plaster have produced this disease, and have led to the death of the patient.\* It would appear that this disease is contagious, at least it is certainly true, that if it begins in a ward of our hospitals, several persons become affected by it, and it often extends through the hospital.

#### TREATMENT OF ERYSIPELAS.

In this town the following plan is pursued, and which, *for London*, undoubtedly is the best. At first give calomel, for the purpose of restoring the secretions of the liver and intestines, and the liquor ammoniæ acetatis with antimony to act upon the secretion of the skin, and then give the sulphate of quinine; it is a most powerful tonic, excites in the stomach a genial warmth, and often will remain in that organ when bark will be rejected.†

\* Equal parts of the emplastrum thuris compositum and emplastrum saponis form a better plaster than the common adhesive.

† I take the liberty of introducing the following case of erysipelas, as remarkable on account of the great extent of the disease, and also as showing the beneficial effects produced by the exhibition of sulphate of quinine.—July 5th, 1824, J. Hawks, æt. 46, a plasterer by trade, was admitted into St. Thomas's Hospital, on account of an erysipelatous inflammation of the right leg, resulting from a contusion near the internal malleolus. The erysipelas appeared on the evening of the same day on which he received the injury, and he had been previously in an indifferent state of health. When admitted, the inflammation extended nearly to the groin, completely surrounded the extremity; his bowels were confined, and he complained of heat and pricking pain in the affected limb: the constitutional irritation was also very considerable. He was ordered to take fifteen grs. of the compound pill of colocynth with calomel, and to apply a spirit wash over the inflamed surface: also, to allay irritability, small doses of calomel and opium were directed to be given every night. On the following day, my colleague, Dr. Elliotson, saw the patient with me, and ordered, in addition to the calomel and opium, five grs. of the sulphate of quinine, five drops of dilute sulphuric acid, and two oz. of water, to be taken every six hours: with an allowance of three pints of milk daily. On the 7th, the inflammation had extended a little, and vesicles had formed on the thigh: the former medicines were continued, and castor oil ordered to be taken occasionally as required. 9th, As the pulse was rather feeble, I desired he should have a pint of porter daily, in addition to the other remedies. On the 10th, the erysipelas had extended up the side nearly to the axilla, on the abdomen almost to the median line; it also covered the whole of the nates and back: a spot on the dorsum of the foot appeared disposed to become gangrenous, and he was altogether weaker. He was ordered to take the quinine every four hours, to have beef steaks daily, with another pint of porter, to continue the calomel and opium, and also the spirit wash, excepting to the foot, which was to be poulticed. 11. The calomel omitted, as his mouth became slightly affected. 12th. To continue and have four ounces of sherry in addition. 13th. Another pint of porter was ordered. From this period he continued to improve, and he took daily beef steaks, three pints of porter, four ounces of sherry, also the sulphate of quinine, every four hours, and the opium at night; the slough on the foot separated quickly from the application of the nitric acid lotion, and the erysipelas gradually disappeared, causing a loss of the cuticle. Matter formed in the cellular texture on the calf of the leg and at the under part of the thigh; it was discharged by incision, and the parts quickly healed.

*Experiment.*—My colleague, Dr. Marcet, now deceased, but late a physician of Guy's, endeavoured to ascertain whether the antiphlogistic, or tonic, mode of treatment was best for this disease; therefore he put two persons into adjoining beds, having erysipelas; to one of whom, after purging him, were given tonics, and a generous diet; to the other, saline medicines, and low diet, blood likewise was abstracted from the latter; they both recovered; the former rapidly, while the latter remained in a debilitated state for a very considerable period.

*Cases.*—Where erysipelas attacks the lower orders of this town, who weaken their constitutions by the excessive use of ardent spirits; porter, wine, and even spirits may be sometimes advantageously employed as remedies. Two cases of this disease which I saw in the other hospital, proved the truth of what I am now saying: a man had dreadfully severe erysipelas, his head swollen to an enormous size, and his recovery thought impossible, when it was discovered, one day, that his wife brought him some gin. He declared that he was better from having drank it, was consequently permitted its continuance, and, to the astonishment of all, he rapidly got well. A short time after this another man similarly circumstanced, was brought into the same ward; and from the result of the above case, I directed the sister to give him spirits also; and this patient recovered nearly as speedily as the former. But it is in the debility consequent upon the first stage of the disease that this plan is to be resorted to. The local treatment of erysipelas consists in the application of camphorated spirits of wine in the first stages. When the vesications are either about to break, or are broken, powder the part with starch, and if gangrene be produced apply a Port wine poultice, or the nitrous acid lotion, in the proportion of a drachm of the undiluted acid to a quart of water. Fomentations and emollient poultices relax the parts, and dispose to gangrene.\*

At one time the erysipelas extended from the toes of the right lower extremity, to the occiput, occupying the whole of the limb, the back and nates, and reaching as far on the abdomen of the same side as the linea alba.

I attribute the favourable termination of this case in great measure, to the judicious employment of the sulphate of quinine, by my colleague Dr. Elliotson which appeared to give tone and vigor to the system, as well as to allay the nervous irritability, so constantly attending this form of inflammation.—T.

\* Mr. Copeland Hutchison has advised incisions in the gangrene of erysipelas.

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THERE is another form of inflammation, which I shall term *cellular*, as it appears to be principally situated in that texture. I mention it here, as it is sometimes confounded with true erysipelas, and because it so frequently terminates in gangrene. It is usually situated in the extremities, and is often produced from very trifling injury. I have seen five cases within these last two years in which it arose from slight injury to the elbow, occasioned by the persons falling on the olecranon.

Shortly after the accident, pain is experienced at the wound, and the sur-

## LECTURE X.

## ON INJURIES OF THE HEAD.

THESE injuries are of the most dangerous kind from the influence which they produce upon the brain and nervous system.

The nervous system is composed of the cerebrum, cerebellum, and medulla oblongata, which principally supply the organs of sense and their appendages with nerves, and of the medulla spinalis, with the nerves of volition and sensation proceeding from it. But there is a second system of nerves in the body, called the grand sympathetic, which is distributed to the heart, and to the viscera of the abdomen: it communicates with most of the nerves of the brain, and with those of the spinal marrow: it forms by its branches a large ganglion, or several ganglia, called the semilunar, situated behind the stomach, and a plexus proceeds from this, which distributes branches to the greater part of the abdominal viscera.

The eighth pair of nerves of the brain forms a large communication with the ganglion behind the stomach.

If an injury happens to the head, the functions of volition and sensation are diminished; the stomach is disordered through the medium of the par vagum; and from the general communication between the grand sympathetic nerve, and those of the brain and spinal marrow, the functions of the heart and of the abdominal

rounding parts become swelled, from effusion into the cellular tissue, but the integument is scarcely discoloured; this swelling extends gradually, so as to cover the whole of the extremity in a few days. Constitutional symptoms now arise, the patient is restless, anxious, and has occasional rigors, succeeded by heat; the skin becomes partially discoloured, and on these parts vesicles are formed, which burst, and expose gangrenous spots beneath: when these spots separate, the cellular tissue is found also to be gangrenous, not only the portion thus exposed, but that likewise which is situated to a considerable extent beneath the surrounding integument. By the subsequent separation of this substance the connexion between the integuments and subjacent fasciæ, muscles, &c. is destroyed; and I have thus seen nearly the whole of the integument of the upper arm disunited from the parts beneath.

This form of inflammation differs from the true erysipelatous in the following particulars: The integument is not at first affected, nor does it ever assume the florid colour which attends erysipelas: the constitutional symptoms do not precede the inflammation, but appear to be consequent on the local affection; it also always terminates in gangrene of some portion of the cellular tissue.

The constitutional treatment is much the same as that required in erysipelas; but the local applications should be employed with a view to promote the suppurative process (unless the inflammation be quite incipient.) For this purpose fomentations and poultices are proper.

If the separation of cellular tissue has been extensive, great care must be taken to keep the disunited integument in contact with the subjacent parts, otherwise it will be very likely to slough: to effect this I have usually employed strips of the soap cerate plaster, which are applied so as to leave some of the openings uncovered, to allow of a passage for the discharge, until the desired union has taken place.—T.



viscera become affected. The powers of the mind are also diminished; the memory is lost; the judgment is enfeebled: thus sensation, volition, the involuntary actions, and the powers of the mind, are diminished or suspended.

*Concussion and compression.*—The causes of the symptoms of injury to the brain are two: 1st. Concussion. 2d. Pressure, which may be the result of extravasation of blood, of depression of bone, or of matter produced by inflammation on the brain.

I shall first describe the symptoms, dissection, and treatment of concussion.

*Symptoms of concussion.*—When you approach the bedside of the patient who has a concussion of the brain, you find him in what you would suppose a sweetly tranquil sleep: his breathing is easy and not quicker or slower than natural: his pulse is beating with steadiness, and with its usual velocity, and you would be disposed to say, do not disturb him, but let him sleep on. But if you attempt to rouse him, he is with difficulty excited; if he be spoken to, he mutters, and returns an incoherent answer, and you then discover that he is comatose. Upon inquiry it is found, that he has received a severe blow upon his head, that immediately after he was senseless, and unable to stand, and that he had since vomited. At first a torpor exists in the intestinal canal, and considerable difficulty in procuring an evacuation, but afterwards the fæces are involuntarily discharged: in a few hours the bladder is distended, from the accumulation of urine, which demands the introduction of a catheter for its removal; but after some time the urine also passes involuntarily.

There is sometimes in these cases bleeding at the nose, and from the blood trickling into the throat and stomach, blood is vomited; the pupils of the eyes are generally natural; but if changed, both are a little dilated, or sometimes one only. The state of the pulse is curious. Although when the patient is undisturbed it is natural, it scarcely ever fails to be quickened, if the patient is capable of making any effort to rise, and exerts himself for that purpose. The carotid arteries sometimes beat, under an exertion, with a force disproportioned to the other arteries of the body; but generally this symptom is not observed until after a few hours.

*Mind.*—The mind is variously affected, according to the degree of injury which the patient has sustained. In some cases there is a total loss of mental power; in others the patient is capable, though with difficulty, of being roused to make a rational answer, but again sinks immediately into coma. Sometimes the memory is lost, at others only partially impaired. A case is generally known to surgeons, of a man who, in St. Thomas's Hospital, was found talking in a language which was not understood, until a Welch woman entering the ward, heard this man talking Welch, but the blow on his head had occasioned the loss of his recollection of English. I once witnessed a very similar circumstance. I attended a German sugar baker, with disease in his brain; and when I

first saw him he could speak to me in English; but as his disease increased he lost his English, and I was obliged to have an interpreter, for he could answer only in his native tongue.

It frequently happens, that the patients when roused will be perfectly sensible, and answer any questions rationally; but if left undisturbed the mind appears to be occupied with some one circumstance, of which they are constantly talking. Mrs. — fell through a trap door, in a house on Bennet's Hill, Doctor's Commons, on the 4th of December. When taken up she appeared as if in a sound sleep; her pulse was a little quickened, and her breathing natural; she was bled and purged. 5th. Complained of pain in her head, bled again. 6th. Restless, screams, and says she has universal pain. 8th. More composed and sensible, pulse quick and small; her bowels keep freely open. 9th and 10th. Sometimes sensible, at others talks incoherently, evacuating plan pursued. 12th. Much better, being more easily roused, still talking incoherently at times: fancying she has been brought to bed of five children, and distressed because she fears she has not milk enough for all of them. She frequently said, "My God what a regiment to go to school; I must not lie in again for three years." This was accounted for, by her sister having just lain in, and she had come to be with her during her confinement.

She ultimately recovered.

Upon inquiring of patients respecting their accident, they know nothing of it. If the injury has been occasioned by a fall from a horse, they can only remember mounting and riding to some distance, but do not recollect that the animal ran away, or had thrown them; nor, however perfectly in other respects they may recover, have they ever any recollection of the kind of accident; yet when they regain any power of volition, or sensation, they will act from habit. This is well illustrated by the following case. June 3d. Mr. S.'s horse ran away in Chiswell Street, and rushing against a dray was killed. Mr. S. was thrown over the dray, and was taken up senseless. I saw him about half an hour after the accident, when he was restless and impatient: he had two wounds on the scalp, one of which penetrated to the bone. He was immediately bled; but being seized with violent convulsions, and his pulse being slow and weak, the vein was closed. 4th. In the same state as on the preceding evening; at noon his pulse being hard and quick, he was bled to twelve ounces, and afterwards became more sensible. 5th. Had passed a restless night; the pulse full and slow; he was cupped on the neck. 6th. He ordered the servant to quit the room, got out of bed, bolted the door, and had a stool, but returned to his bed without unbolting the door, which was obliged to be forced open, as they could not rouse him. At another time he lathered himself with his blistering ointment, as he wished to shave; and washed his feet with some lemonade in the chamber-pot. 7th. He was bled to eight ounces. 9th. Ordered calomel in small doses. 10th. His attendants thought he had a fit, but it was only of a min.

ute's duration. 11th. Blisters applied to his temples; he had two fits in the night, one lasted ten minutes, during which he struggled, foamed, and was insensible. Dr. Babington saw him. 12th. Complained of pain in his head; he was bled to four ounces, and purged. 13th. Pulse 65, had been before about 60. Chilly pain over his eyes, again bled in small quantity, and purged. 14th. Very restless; mind wandering; quarrelsome; bowels freely open, pulse quick, his nose bled twice. 16th. Much better, his skin moist, easily roused, more sensible, and listens to conversation. 20th. Answers questions more readily; much improved. He gradually got quite well, but did not recollect any thing about his ride previous to the accident.

It is curious to observe the change which takes place in the intellectual faculties, as alterations are produced in the structure or state of the brain; the gradual diminution of ideas which have been recently acquired, until, at length, they become wholly obliterated. Old persons are observed to be fond of relating the anecdotes of their youth, forgetting incidents of more recent occurrence; and the change produced by injuries to the brain is somewhat similar to the effects of age; the patient loses impressions of a recent date, and is sensible of those which he has received in his earlier years.

The degree of injury sustained by the brain in different cases, however, varies greatly. Some are only stunned or deprived of sense for a moment, others recover in a few hours; some remain, in a great degree, insensible for fifteen to twenty days. Some recover entirely, others have afterwards an imperfect memory. A partial loss of sense will be sometimes produced in the function of one eye, or deafness in one ear, and so of volition, as the squinting will continue which has been produced by an injury of the brain. A degree of fatuity, in some cases, ever afterwards remains; great irritability will continue in some persons, in others the least excitement will produce pain in the head. In one case I knew a remarkable irritability of the stomach remain after concussion of the brain; so that the least excitement would produce vomiting; and this symptom, as well as the usual occurrence of vomiting in these accidents, is probably produced by the direct communication between the brain and the stomach by the eighth pair of nerves.

*Case.*—Mr. T. a medical gentleman, received a blow on the forehead, during a riot which he was endeavouring to quell: he was stunned for a few moments, but did not immediately find any further inconvenience from the injury. A few weeks afterwards he began to feel a constant nausea, followed by occasional vomiting, which, at first, occurred once, then twice, in the course of the day, and at length became very frequent. Sometime after he had received the blow, he was trephined by my uncle, formerly surgeon of Guy's Hospital, but he did not derive any advantage from the operation. The nausea and vomiting still continued, he became



emaciated, was in a constant state of anxiety and distress from the nature of his complaint, and died exhausted, in consequence of the injury.

A permanent loss of memory is sometimes the effect of these accidents; frequently the patient has a difficulty in uttering the words which should express his ideas, and uses wrong terms; the judgment is enfeebled, giddiness, pain in the head, and great irritability of the nervous system, sometimes result from concussion.

*Case.*—Mr. Blanchard was overturned in a carriage in 1816, and wounded on the forehead by the stud of the window. In twenty minutes he became sick, and was speechless, though quite sensible: he had severe spasms in all the muscles, and a creeping sensation in his whole frame. On the third day he returned home; for four days after he had delirium: this was followed by great debility, which continued for a year; so that he was scarcely able to walk; the whole head was cold and benumbed; he had frequently, from attention to business, or excitement of mind, numbness and coldness of the head, and delirium. Two years ago he had apparently recovered, and he travelled to the Lakes; on his return he had swimming in the head, sickness and delirium; he was bled freely for the first time, and, excepting once, has ceased to be delirious since. An incision was then made on the part injured, and the bone was found to have been slightly fractured. A year and a-half ago he became delirious for half a day; but when this subsided his legs became painful yet benumbed, and was succeeded by lameness which continued for a year.

*His present State, August, 1814.*

1st. Difficulty of utterance, and in expressing the ideas he wishes to convey.

2d. Benumbed sensation in the head and legs.

3d. Great debility.

4th. Affected by weather; in a humid day has more numbness and debility.

5th. Exertion of mind augments his unpleasant feelings. Exercise increases the numbness in the head and legs. Sight is weakened. Sleeps exceedingly well.

6th. Pressure on the cicatrix benumbed the part, and made him almost speechless.

7th. A leech applied upon the part produced most excruciating pain for an hour, with spasms. He has tried a great variety of remedies, without effect.

I have known concussion arise from the general shake of the body, unaccompanied by any blow upon the cranium, pain in the head succeed, with the usual symptoms of concussion, and the patient's life be greatly endangered.

*Dissection.*—With respect to the state of the brain under con-

cussion, when the injury has not been excessively severe, it seems that the symptoms are merely the effect of a disturbance of the natural course of the blood through the brain. A fit of vomiting, by forcing the blood through the brain, will sometimes almost immediately restore the functions of the mind and body. It seldom happens, that this state of the brain destroys; but when it does, nothing is found upon the examination which will account for the symptoms. It is, therefore, an alteration of function, but not a disorganization.

*Laceration.*—But when the concussion is very violent it is attended with lesion of the brain. We have a number of preparations before us, showing this state of the brain, in which you will see laceration of it accompanied with slight extravasation.

The first example of this which I witnessed was in a patient of Mr. Chandler's in this hospital.

*Case.*—John Stam was admitted into St. Thomas's Hospital, Saturday, Feb. 15, 1793. By the overturning of a cart he had received a wound in the arm, and had some symptoms which led the surgeon to think him intoxicated. On visiting him a few hours afterwards he seemed to be perfectly sensible, but had lost his speech. There did not appear to be any injury of the head, on an attentive examination, yet by signs he led us to think this the injured part: his pulse was full and quick. He was bled and purged, and on the following morning his pulse was smaller; he had slept soundly, and seemed to be much disposed to sleep. On the following day he continued pretty well, taking plenty of nourishment. On the 18th, in the evening, he had a sudden change for the worse; his features altered, his mouth was drawn a good deal to the side; he had difficulty in swallowing, and his urine and his fæces passed off involuntarily. He continued thus until the morning of the 20th, when all his bad symptoms left him, excepting the loss of speech. He remained free from any other symptoms for many days (excepting hiccough;) but then his appetite began to fail him, and he became emaciated. He had, about a fortnight after his admission, a return of the difficulty of deglutition, and the urine and fæces again passed off involuntarily. He had now every evening at nine o'clock a delirium come on, which rendered it necessary to strap him to his bed, as he struggled violently. On the 8th of March he died, just three weeks after his admission. The wound in his arm discharged but little the first two days, but afterwards it wore a very bad aspect. He had enjoyed a good state of health previously.

#### DISSECTION.

On examining the head, the scalp and cranium were found free from injury. The dura mater also appeared healthy. On the pia mater there was some slight effusion of a transparent serum; on cutting away the hemisphere to show the centrum ovale, the brain

was found lacerated. The colour of the medullary substance, as well as the cortical, was changed to red in many places, and the size of the laceration was about two inches long by an inch wide. The substance was very soft, and it appeared ragged. There was a small quantity of purulent matter found in some places. Ulceration seemed to be present, as there were a number of small holes in the brain surrounding the laceration.

*Case.*—Another very extensive case of laceration occurred in the person of a friend of Lord Nelson's. Mr. Coppendale, 27th June, 1805, fell from his horse in the Borough, and was brought to Guy's hospital. He had a wound on the back of his head, which bled freely. He was totally insensible; the pupils were dilated; the pulse 60, and regular. He was bled from the arm to a considerable extent before he could swallow, and an enema was administered.

On the second day he was insensible, his pupils were contracted and remained so in the dark or light. On the third day he gave signs of returning reason: swallowed freely, and could be roused to answer a question. He performed all the animal functions, and asked for the means of doing so. He knew several of his friends. His pulse still at 60. He said he was very well, and wished to rise; but frequently complained of his head. On the fourth day favourable symptoms began to vanish; he became more sleepy, and more difficult to rouse; and when Lady Hamilton called upon him, he could not be made to open his eyes, or speak to her. From this day the torpor increased; he passed his stools and urine in bed; his eyes became nearly insensible to light, though one of his pupils was still contracted, and the other remained to the last moment of his life dilated and immoveable. He slept almost constantly, though with frequent intervals of restlessness. He had no convulsive motions, excepting a slight subsultus tendinum a few hours before his death. His heat remained natural, until thirty-six hours before he died, when it was irregular and unequal; the face, by turns, red and pallid; the legs, one warm, the other cold; forty hours before his death the pulse began to flag, but quickened on the least motion: at one time it was 70, and in ten minutes after 120; a few hours before death it was constantly quick, to 150, and sometimes higher; the breathing only thirty times in the minute.

The treatment pursued was, bleeding, blisters to the neck, and sinapisms to the feet.

#### DISSECTION.

Extravasation on the scalp, some blood on the dura mater and brain, and some from the lateral sinus of the dura mater, which had been torn. Brain torn in five different places, two in the anterior, three in the middle lobes.

Skull fractured at the basis, through the meatus auditorius; petrous portions of the temporal bones and sella tursica.



The following is also an interesting case:

*Case.*—A waiter at a coffee-house in the Strand, who had been previously subject to epileptic fits, was ordered to clean the windows of the first floor of the house; and whilst in the act of doing so, and standing on the outside of the window, he was supposed to have been seized with a fit, and fell into the area beneath. On being taken up, a wound was found on his forehead, and he had lost both sensation and volition. Having resided in the Borough, he was carried to Guy's Hospital, and when admitted there, a fracture was discovered in the os frontis, but without any depression of the bone; and as he had no symptoms of compression, the operation of trephining was not performed. On the following day to that of his admission he died, without having, in any degree, recovered from the accident.

When the head was examined, the fracture was found confined to the upper part of the os frontis; and opposite to the fracture on one of the anterior lobes of the cerebrum, a considerable laceration was discovered. On the falx major was situated a large patch of earthy matter, evidently of long standing, which had probably been the cause of his epileptic fits.

If, then, it be asked, in what does concussion consist? the answer is, that if it be slight, it is merely a disturbance of the circulation in the brain; if violent, the brain is lacerated. A knowledge of this leads to a judicious treatment of the injury, as laceration of the brain is frequently followed by extravasation: and concussion in the commencement, may be compression in its result.

#### TREATMENT OF CONCUSSION.

The great danger which we have to guard against in the treatment of concussion, is inflammation of the brain. This principle must direct our practice; and in order to prevent inflammation, we must soon after the accident take away a very considerable quantity of blood. By bleeding largely, we not only remove existing inflammation, but we prevent that which would otherwise occur. This practice, however, may be carried to excess. You must, in the repetition of bleeding, regulate your conduct by the symptoms; observe whether there be any hardness in your patient's pulse, and whether he complains of pain in the head, if he have still the power of complaining: watch your patient with the greatest possible anxiety; visit him at least three times a-day; and if you find any hardness of the pulse supervening, after the first copious bleeding, take away a tea-cup full of blood; but do not go on bleeding him largely, for you would by this means reduce the strength of the patient too much, and prevent the reparative process of nature. It is necessary that there should be a slight degree of inflammation, for without this the reparative process cannot proceed, or the patient ultimately recover: but it will be your duty to keep this inflammation within due bounds. I shall mention a case in which

fatal consequences ensued from the error committed by the surgeon in bleeding his patient to such excess, that the slight degree of inflammation necessary for adhesion was removed, and the restorative process of nature consequently prevented.

In these Lectures, Gentlemen, I feel it to be my duty to describe to you surgery as it is, and not in the glowing colours in which it is painted to you in books. I am most anxious that you should omit nothing which may contribute to increase your professional skill, and enable you to afford the greatest possible degree of relief to the sufferings of humanity; but those who blazon forth our profession as one which is attended with undeviating success, are only deceiving you. You must hear the untoward cases of your profession, as well as those of which the issue is favourable, in order to form a correct judgment in your minds of what surgery really is. It is for these reasons, that I shall never hesitate, "*coute qui coute*," to detail to you, and perhaps to the public, those cases which have terminated unfavourably. I have a duty to perform, and I shall never shrink from the discharge of it. It is by detailing to you the unfavourable as well as the favourable cases, that I can alone perform that duty; for it is by such a course alone that I can point out to you the rocks which you are to avoid, as well as the haven in which you are to endeavour to anchor. The case, to which I last alluded, was one of concussion, accompanied with slight laceration of the brain, which occurred in the other Hospital. The gentleman, under whose care the patient was, thought it right to bleed him, and that he could not bleed him too largely. He accordingly bled not only from day to day, but twice a day. The consequence of this mode of treatment was, that the patient became perfectly pale, was in a state of considerable dejection, not of the mind, but of the powers of the body, and died, without any symptoms of inflammation of the brain, ten days after the injury. On examination of the head, it was found that there was a slight laceration of the brain, with some degree of extravasation of blood; but that not the slightest attempt had been made by nature to heal the wound. You are aware that the brain heals, like any other organ, by the process of adhesion; but, in this case, the quantity of blood taken from the patient was so large, that the slight inflammation necessary to the adhesive process was removed, and the powers of restoration consequently prevented. Still it is often necessary to take away blood after the first large bleeding; but it must be taken in small quantities, and you must watch the patient with the greatest possible anxiety; for the symptoms can alone regulate your practice. Sometimes it is necessary to take away large quantities of blood, in repeated bleedings. I was called to a gentleman, of very full habits, who had fallen from his horse in riding to London. Mr. Constable, of Woodford, who attended him, had already bled him, but I judged it necessary to bleed him again, largely; and I took blood in smaller quantities from him, day after day, watching the pulse with the greatest anxiety, and bleeding

him so far as to reduce the hardness of the pulse, without diminishing too much the powers of his body. The whole quantity of blood taken from this gentleman, by bleeding from the arm, opening the temporal artery, and the application of leeches, as far as this could be estimated, amounted to about two hundred and eight ounces of blood. One hundred and eighty ounces were taken from the arm, the rest by leeches and from the temporal artery; yet such was the hardness of the pulse, that at the last bleeding there was some degree of inflammation of the brain remaining. This gentleman recovered.\*

\* I have taken the liberty of introducing the following case, as one of considerable interest; the patient having, for some time previous to the accident, been subject to symptoms of cerebral affection.

William Smith, æt. 19, a stout, tall, and robust man, fell into a cellar, about twenty feet deep, and appeared to have fallen on the right side of his head, there being two small wounds of the scalp on that part; the pericranium was not detached. Tuesday, March 11, 1823, he was brought into the Hospital, in a state of insensibility; his countenance flushed, both pupils contracted; but, upon disturbing him, they became very much dilated, and varied in appearance very frequently. Pulse quick, hard, full, and regular; he was excessively restless, and upon every slight exertion the pulse became very much accelerated; the breathing was slightly stertorous. From sixteen to eighteen ounces of blood were taken from the arm immediately; after which the pulse became rather softer, breathing less audible, and a slight degree of faintness was produced. At five o'clock the same day, the pulse having risen from 90 to 116 in a minute, eighteen ounces more blood were taken, which had a more marked effect on the pulse, and produced a greater degree of faintness than the former; but he again became very restless, and at twelve o'clock the same night, lost twenty ounces of blood from the back part of the neck by cupping; the head was shaved and a spirit lotion applied over the whole surface; twenty grains of the colocynth and calomel pills were given. Wednesday, 12th, had passed a very restless night; remained much in the same state. Pulse quick and frequent, but not having had any evacuation from the bowels, six grains of calomel and  $\mathfrak{zss}$ . of rhubarb were given. At half past eleven o'clock A. M. he was again cupped at the back part of the neck, and lost fourteen ounces of blood: a large blister was applied to the back part of the neck: he was still unable to answer any question put to him: the state of the pupils varied as before. Four o'clock, a glyster was given, containing an ounce of castor oil, but produced no evacuation. Seven o'clock, five grains of calomel and twenty grains of jalap were given, and another glyster at eleven o'clock. A short time after the latter, he had a considerable evacuation, which reduced the pulse in frequency and fulness. Thursday, 13th, had passed a restless night, but less so than the previous one; the bowels had been freely evacuated, and he was much reduced; his pulse became small and frequent, and his countenance rather pallid; he appeared conscious of what was said and done, but unable to answer any question. The blister was kept open and discharged considerably.—Friday, 14th, remained restless, and unable to answer any question: pulse quick and frequent; bowels moderately open: an ounce of castor oil was given; blood was again taken from the arm to the extent of fourteen ounces; and two grains of calomel, with a grain of conium, given at bed time.—Saturday, 15th, Much the same: had taken two pills in the morning, and was to repeat them at bed time: he appeared much more conscious of what was said, and could answer questions occasionally.—Sunday, 16th, Having passed a restless night, and his pulse being quicker and fuller than the previous day, he was again bled to the extent of eighteen ounces, and which, when coagulated, had a buffy appearance on the surface; but the crassamen-



You are to use bleeding as a means of preventing inflammation; but you are not to resort to it as a matter of course, the moment you are called to a patient under concussion. A man falls from his horse, and the instant he is raised from the ground some surgeon thinks it necessary to use the lancet. This conduct is quite irrational; for, suppose the pulse could scarcely be felt at the wrist, and the surgeon were in such a case asked why he proceeded to bleed, what would his answer be? The probability is, that he could make no reply; or he would perhaps say, that he bled because the accident had determined a great quantity of blood to the brain. It is not with this view that we bleed in concussion, but in order to prevent inflammation. I have seen patients, who would have died if a large quantity of blood had been taken away at the time of the accident. Thus in the case already described, when I first saw it, the pulse was scarcely perceptible. I took a little blood from the arm, and the patient was immediately seized with convulsions, like an epileptic fit, which I thought would have proved fatal. I closed the arm, and I would not upon any account have taken more blood from him at that moment.

*Case.*—Some time ago I saw a man, at the other Hospital, who had received a blow on the head. He was pale and dejected, and his pulse could scarcely be felt. I said to the dresser, you must not bleed this man at present; there is rather too little action than too much. Wait till the pulse rises, and then bleed him. In the evening reaction took place; the pulse rose, and the dresser then very properly bled him. Inflammation was by this means prevented, and the man did well. The principle on which you should act, Gentlemen, is never to do any thing in your profession without a good reason, which, whatever may be the result of the case, will leave your conscience clear. You are not to bleed because a patient has received a blow upon the head, but you are to bleed to prevent inflammation; and I hope to be understood, that it is not to bleeding that I object, but to immediate bleeding in those cases in which there is a remarkable depression of the nervous power.

*Emetics.*—Emetics have been proposed as remedies for concussion, and I certainly have seen vomiting useful; I consider the ef-

fect remained loose; the pills were continued as before.—Monday, 17th, Had passed a better night, and answered questions much more readily; the pills continued.—Tuesday, 18th, Opening medicine was given.—Wednesday, 19th, Had been more restless than the former night; pulse quick, hard, and full; countenance flushed; he was bled from the arm to fourteen ounces; pills continued, &c.—Thursday, 20th, Much the same; eight ounces more blood were taken; pills continued, &c.—Friday, 21st, Less restless than before; bowels rather confined; infusion of roses  $\mathfrak{z}$ jss. and Epsom salts  $\mathfrak{z}$ j. were given, three times a day.—Saturday, 22d, Complained of slight pain in the head; pulse quick; bowels open; eight ounces of blood were taken; after this he gradually recovered, and was discharged from the Hospital on Wednesday, April 23d, 1823.

The quantity of blood taken amounted to one hundred and thirty ounces, in the space of eleven days.—T.

forts of nature to relieve herself, after injuries, as generally salutary; and thus it is that the vomiting, which is excited in cases of concussion, acts beneficially, by relieving the stomach of its contents, and by propelling the blood to the brain, and thus restoring the powers of life. But the vomiting excited by nature often restores the patient to his senses only for a short time; he is sometimes relieved, but without continuing so long; he looks about him and lapses into his former state of aberration of mind, from which he had received merely a temporary relief. When emetics are exhibited as a remedy in concussion, there is only one thing that I fear from their use; when there is any extravasation of blood in the brain, or any tendency to apoplexy, then they should be used with caution; and it is on that account that I wait three or four hours after the accident before I order them. It is in lenient cases of concussion that they are useful: in lacerations of the brain they are dangerous.

*Purgatives.*—With respect to the exhibition of cathartics, the bowels should be kept open by calomel purges, followed by the infusion of senna and sulphate of magnesia. The calomel should be given about two hours after the accident; and it will be useful to give to the patient, at the same time, a quantity of acidulated drinks; as by this means a disposition to purging is kept up, counter irritation is produced, and the blood is drawn from the brain to the intestinal canal. Submuriate of mercury is proper as a medicine, and lemonade as a drink.

*Diaphoretics.*—Perspiration is very desirable, and for this purpose antimonials are employed. The pulv. ipec. comp. (Dover's powder) is not generally used to produce moisture of the skin, on account of the opium it contains, as it confounds the judgment, and prevents your seeing what are the effects of the opium, and what those of the injury; for opium produces the same effects upon the brain as some of the injuries to which it is liable.

*Counter irritation.*—Counter irritation is of use, but not until other means have been resorted to: the object in applying blisters is, by exciting inflammation of the scalp, to subdue the inflammation of the brain when other means have failed. I have known a patient with pain in the head, sickness, loss of strength, and throbbing of the carotids, who had been relieved by free bloodletting for about two hours only, much benefitted by the application of a blister.

*Trephining for after symptoms.*—For the symptoms remaining after concussion, the trephine used to be employed; but it now becomes a question, whether it ever ought to be resorted to in these cases? What will trephining do? Probably great harm, by disturbing the brain; and, if not, no good can possibly result from it. Now for the proofs: first, that it does no good. Gentlemen, I never lecture to you but from the recollection of some case that has occurred to me, from which I form my opinion. In a former part of this Lecture, I mentioned to you a case of great irritability of the stomach, produced by concussion, the effect of a blow on the forehead, which happened at Yarmouth, in Norfolk. Mr. W. Cooper for-

merly surgeon of Guy's Hospital, visited this gentleman, and prevailed upon him to suffer the trephine to be applied upon the part of the forehead on which the blow was received; and, when the bone had been removed, the dura mater was sound, and no relief whatever arose from the operation; a direct proof that it is useless. Dr. Farre informed me, that he knew a person who was subject to epileptic fits after concussion of the brain. The operation of trephining was performed, and he died soon afterwards.

Forty years ago, trephining used to be the plan generally adopted with the patients admitted into the London Hospitals; many were submitted to the operation; inflammation of the membranes of the brain supervened, and nearly all died; recovery being very rare. But do our patients now die from the effects of concussion? No; by depletion we rarely lose a patient.

After the expiration of my apprenticeship at these Hospitals, I went over to Paris, to see the practice of Desault, at the Hotel de Dieu; and I found that scarcely ever under any circumstances did he trephine; and he was more successful than the English surgeons. Trephining in concussion is now completely abandoned.

In the treatment of concussion, when the patient has any mental power remaining, let all excitement of the brain be avoided. I was very much struck, about twelve months ago, with the following circumstance: a young gentleman was brought to me from the north of England, who had lost a portion of the skull, just above the eyebrow; and I was asked (for it was for this purpose that I was consulted) what protection should be given to the brain. On examining the head, I distinctly perceived the pulsation of the brain was regular and slow; but at this time he was agitated by some opposition to his wishes, and directly the blood was sent with increased force to the brain, the pulsation became frequent and violent; if, therefore, you omit to keep the mind free from agitation, your other means will be unavailing. All common external stimuli should be abstracted, as light and noise. A dark and quiet room must be recommended.

*Treatment of children.*—Lastly, in the treatment of children: as you cannot always bleed them from the arm, you must give the submurias hydrargyri (calomel,) with acescent drinks, so as to purge them; leeches must be applied to the temples: and you may open the jugular vein.

For the symptoms which remain after concussion, as pain in the head, giddiness, diminution of sight, and deafness, it is right to wash the head with spirits of wine and water; or to use the shower bath. These are the best means for giving power to the nervous system, and bringing the action of the brain into a healthy state. Sometimes I advise ungt. lyttæ to be rubbed upon the head, and pil. hydrarg: and ext. colocynth comp: to be given. Electricity, in nervous debility of an organ, is sometimes useful. In long-continued pain of the head, I sometimes make an incision in the scalp, and open an issue, for the purpose of supporting external irritation; and have seen advantage arise from producing a slight exfoliation.



## LECTURE XI.

COMPRESSION OF THE BRAIN, THE CAUSES WHICH GIVE RISE TO IT, ITS SYMPTOMS, AND THE TREATMENT WHICH THOSE SYMPTOMS REQUIRE.

*Symptoms.*—WHEN a patient has a loss of sensation and of voluntary motion, an apoplectic stertor, slow labouring pulse, and one or both pupils dilated, it will be generally found that the brain is compressed.

*Causes.*—The causes which produce compression are three: 1st, Extravasation of blood; 2d, Fracture with depression; and 3d, A formation of matter within the skull. These are the three causes which give rise to compression.

*From extravasation.*—I shall first describe compression when produced by extravasation. When the brain is compressed by extravasated blood, the symptoms do not occur immediately after the accident; the person at the time of the injury is stunned, recovers himself, and a short time after falls into a comatose state, and then the apoplectic stertor begins. I will relate to you some cases to illustrate this. A child was playing on a chair, from which it fell on a stone floor, and received a severe blow on the head: the child cried violently, was sick, but was during the evening sensible. It was put to bed a little before its usual time; in the night, the servant was disturbed by its restlessness, and on the following morning it was found dead.

*Case.*—Mr. R. W. æt. 19, was driving in a gig with his brother, when turning a corner to the right, the horse ran away, and in endeavouring to stop him the rein broke: he then vaulted over the hind part of the gig, and fell upon the back of his head, neck, and shoulders; he got up, but complained of pain in his hip and back; he drank a glass of water, and was then taken to the stables in the gig, where he remained half an hour, complaining of sickness, after which he walked about two hundred yards to the house, and got into bed, still feeling very sick: torpor gradually came on; and his extremities became cold. The accident happened at five o'clock on the 24th of April, and he died about two o'clock on the following morning.

*Case.*—Thomas Fennel, æt. 70, having fallen from a height of twenty-two feet, was brought into St. Thomas's Hospital, on the 1st of October, 1816. A lacerated wound was found in the scalp, over the right parietal bone, but no fracture. His pulse was slow and labouring: his pupils dilated: his breathing was natural: he had not vomited. About ℥j. of blood was taken from his arm, when the pulse rose, and became soft. In four hours after, being very restless, and his pulse having risen, another ℥j. of blood was taken away; his pulse became softer; he had intervals of sensibility, but was extremely restless. In the evening he became again per-

fectly sensible, and muttered a great deal; his pulse was feeble and quick; shortly afterwards his breathing became stertorous, his extremities cold, and he gradually sunk.

#### DISSECTION.

There was no fracture of the skull: but laceration of the left middle lobe of the brain, with extravasation of blood into the left lateral ventricle, and into the substance of the brain, near the lacerated part.

When extravasation is combined with concussion, the symptoms of concussion, such as I described to you on a former evening, first appear, and the apoplectic stertor and other symptoms of compression succeed.

*Case.*—A gentleman was at a party with some friends. He drank freely of wine, and became inebriated. His home was at some distance from where he spent the evening; and his friends, seeing that he would be exposed to great risk, wished him to stay in London; but he could not be prevailed upon to do so. He mounted his horse, and on the way was thrown. He was carried home in a comatose state; symptoms of concussion showed themselves in a loss of voluntary motion and sensation; at first no signs appeared of extravasation of blood: at two o'clock on the following morning the apoplectic stertor began, and at eleven he died.

*Case.*—A boy was admitted into Guy's Hospital, Oct. 3d, 1816, with an injury to his head; he had been thrown from a horse. He was taken up insensible, and shortly after he vomited: his pulse being very feeble, he was not bled. 4th. He was comatose; the pupils were dilated, but contracted on exposure to light: he could not be roused: his breathing natural: the scalp was sound, but much tumefied in two or three places; an incision was made into the largest of these swellings, which was situated at the upper part of the occipital bone; when a fracture was discovered extending towards the basis, but there was not any depression. He was bled from the arm to sixteen ounces. In the evening his bowels were freely opened by the action of some calomel he had taken; he was very restless, and resisted when an attempt was made to open his eyes; at night he continued extremely restless, and his stools passed involuntarily. 5th. Still rather restless; pupils dilated; took occasionally barley water. In the evening the breathing became stertorous, and he gradually sunk.

#### DISSECTION.

Much blood was effused over the left hemisphere of the brain under the dura mater, more particularly on the middle lobe. The fracture only extended through the occipital bone; it commenced at the right superior part, and passed obliquely downwards through the crucial ridge to the left and inferior part of the bone.

In this case then the symptoms of concussion first came on, and those of compression succeeded.

The extravasated blood producing compression of the brain, is met with in three different situations:—first, between the dura mater and pia mater; second, between the pia mater and brain; and, lastly, within the substance of the brain itself. In the specimen on the table before me, three ounces, the largest quantity I have seen, was effused under dura mater. In this case also there was a large quantity extravasated, opposite to the anterior and inferior angle of the parietal bone; and the dura mater itself was torn. Mr. Abernethy first pointed out that the largest extravasations were at that part of the skull in which the artery of the dura mater passes through the parietal bone. Secondly, between the pia mater and brain; this is of more common occurrence; and in this case a large portion of the brain will often be found covered with blood; not that the quantity of blood extravasated is considerable, but a little is diffused over a large space. This portion of brain before me was taken from a man who fell from the yard-arm of a ship, and who was carried to Guy's Hospital: he died four hours after his admission; and, on examination after death, many of the vessels which pass from the pia mater to the brain were found torn through. Thirdly, within the substance of the brain itself; this specimen was taken from a patient of Mr. George Johnson's, of America Square, who fell from his horse, and was found with symptoms of concussion of his brain, for which Mr. J. attended him, and by the judicious means he employed redeemed the patient from all his urgent symptoms; but some weeks after, having neglected the rules of conduct which had been recommended for his guidance, he was seized with symptoms of inflammation of the brain, of which he died.

Mr. Johnson and myself examined the head together; and we found, in one of the anterior lobes of the cerebrum, a coagulum, deeply-seated, and a little altered in colour from the usual appearance of recently extravasated blood, having a brownish tinge: the brain adhered firmly to the circumference of the coagulum, and exhibited other marks of inflammation.

The diseased part is preserved in the collection at St. Thomas's Hospital.

These are the three situations in which extravasated blood is principally found. I do not observe any variety of symptoms produced by the different situation of the blood; the symptoms of compression arise from the pressure of the blood; and the quantity of blood effused will depend on the size of the vessel of the dura mater that is divided; whatever is the situation of the blood, the symptoms of compression vary but little; if there should, however, be any blood resting on the origin of a nerve, there will be partial paralysis of those parts which that nerve supplies.

*Treatment.*—In the treatment of these cases, there is little to



be done but to deplete freely, for the purpose of preventing irritation and inflammation; the bowels are to be opened, and the patient kept very quiet. If there be a bruise, indicating the spot at which the injury has been sustained, you may trephine, after every other means have been tried ineffectually. If a fracture exists, and the symptoms do not yield to depletion, you will trephine to seek the extravasation. If blood be not found between the dura mater and skull, do not puncture the dura mater to seek for it; it is of no use, as the blood is coagulated and will not escape, and it is seated under the pia mater, or in the brain itself.

#### OF FRACTURES OF THE SKULL.

These fractures are not usually in themselves dangerous, but they become so by being united with concussion or extravasation; when, therefore, you are called to a case of wound in the scalp accompanied with fracture, you inquire as to the nature of the symptoms, to learn if they be those of concussion or of extravasation, and you regulate your treatment in the way in which I have already described. There is also a remote danger in fractures of the skull, from inflammation.

Fractures at the basis of the skull are extremely dangerous, because they are generally united with extravasation; or if not, inflammation of the brain, from the violence of the injury, very often supervenes. The mode in which these fractures are produced is by falling from a great height on the summit of the head. The whole weight of the body is received on the foramen magnum, and cuneiform process of the os occipitis; great injury is in this way done; in many cases a transverse fracture through the foramen magnum, cuneiform process, and part of the temporal bone, is the consequence; a discharge of blood into each meatus auditorius accompanies it; and, where there is no other mischief, deafness sometimes remains for life.

The following cases of fracture, at the basis of the skull, will best show the manner in which these injuries occur, as well as the fatal effects produced by them.

*Case.*—On Thursday, the 17th August, Charles Ellis, a private in the Coldstream regiment, fell from a ladder, about eight feet high, into a cellar, and pitched upon the right side of his head and shoulder: immediately after the accident he was brought to Guy's Hospital. On his arrival he was perfectly sensible, and answered every question which was put to him; the men who conveyed him to the Hospital said that he was insensible for a short time after the accident. On examining his head, a small tumour was found on the lower part of the right parietal bone, and a slight discharge of blood from the right ear. As he was quite sensible, and did not complain much of pain in his head, he was bled to the extent of  $\frac{3}{4}$ xiij. and a purgative was given. He vomited a

great part of the night. On the following morning, his pulse being quick and strong,  $\bar{z}$ vij. of blood were taken from the temporal artery, a draught of castor oil was given at the same time, but was very soon rejected; an enema was then administered, which was followed by a small quantity of fæces. On Saturday morning he was insensible; his pulse upwards of ninety, and strong; sickness and vomiting continued; his thirst great; the skin hot and dry; he was bled from the arm to the extent of  $\bar{z}$ xij. and an enema was administered. In the evening I saw him, and took away  $\bar{h}$ j. of blood from the arm, and the enema was repeated. Sunday morning, the patient still remained insensible; his pulse ninety, and strong; when the bleeding was repeated to the same extent as on the preceding evening, and an enema administered, which was followed by a larger quantity of fæces than any of the preceding. I saw the patient in the afternoon, and found the symptoms somewhat abated; the enema was repeated the same evening. Monday morning, the pulse not so quick and strong as on the preceding day; the skin was covered with a gentle perspiration; but the patient still insensible; the pupils dilated. There was no sickness or vomiting now, except when food or medicine were given, which were immediately rejected: the enema was repeated. In the evening the pulse was quicker, and the symptoms not so favourable as in the morning; ordered venesection to  $\bar{z}$ xij. and another enema. Tuesday morning; pulse quick and small; pupils dilated stools passed from him involuntarily; the tumour on his head was opened, but no fracture or depression was discovered. The following morning he died.

#### APPEARANCES ON EXAMINING THE HEAD AFTER DEATH.

A fracture was found on that side of the head on which the injury was received, extending through the temporal bone, and nearly through the sphenoid bone: there was considerable extravasation on the same side of the head between the dura mater and skull. On the opposite side the extravasation was much greater, between the dura mater and brain; covering nearly the whole surface of the brain on the left side. There was not any thing peculiar in either of the ventricles; but there was a small laceration of the cerebrum on the left side of the head.

*Case.*—June, 1814. Joseph Constable was brought into Guy's Hospital, having fallen about twenty feet, on the railing of a house. When admitted, he complained of great pain in his head and shoulder. There was a wound over the right mastoid process, and another on the shoulder, from which he had lost a considerable quantity of blood. In the same day he became comatose; purgative medicines and injections were administered, by the action of which he appeared a little relieved. On the following day he was delirious, and his pulse full and hard: sixteen ounces of blood were taken from the temporal artery, and purgatives again given.

The next day he was quite comatose and the left side paralyzed: in this state he remained until the following morning, when he died.

#### DISSECTION.

The dura mater was detached from the tranverse ridge of the occipital bone, and from the petrous portion of the temporal bone. There was an extensive comminuted fracture of the petrous portion, with some slight extravasation between the dura mater and bone.

*Case.*—March, 1816, James Devall, æt. 48, a sailor, fell from the main deck of a vessel into the hold, a height of about eighteen feet. When taken up he was insensible, and a large wound was discovered on the upper and anterior part of the scalp, at the left side. He was brought to St. Thomas's Hospital within half an hour after the accident, with the following symptoms: total loss of sense and voluntary motion; slow stertorous respiration; permanent dilatation of the pupils; hæmorrhage from the left ear, and a frothy discharge from the nostrils; pulse intermittent; twelve ounces of blood were taken from his arm, without altering the symptoms, and he died about two hours and a-half after his admission.

#### DISSECTION.

Under the dura mater, over the right anterior lobe of the cerebrum, between three and four ounces of dark grumous blood was found. On removing the brain a very extensive fracture was discovered, beginning above the right mastoid process, and extending forwards to the anterior part of the squamous portion of the temporal bone, inwards through the petrous portion, and backwards through the foramen magnum. Another fracture extended across the anterior part of the basis of the skull.

A fracture within the orbit sometimes occurs, from which a specimen, now in the collection at St. Thomas's, was taken; when destruction of life was the consequence of the injury received. I will give the history of the case.

*Case.*—Thursday, June 27th, 1793, A girl, about 12 years of age, whilst walking with a large pair of scissors in her hand, fell, and the point of them entered between the eyelid and the fore part of the globe of the eye: on the scissors being drawn out, some blood followed: the eyelid fell, and she was unable to raise it; she did not, however, complain much of pain in the orbit, and had no pain in her head. Friday, Mr. Wathen was consulted, who, upon examining the part very carefully, found the eye uninjured, and could discover no wound of the conjunctiva or eyelid. The girl walked to Mr. W's. and returned on foot, without being much fatigued. Saturday: She walked about the house now and then, but was soon tired, and then laid down. Sunday: Free from pain.



except a little in the eye, but could not see with the other eye. She still walked about her room with assistance. Monday: Her mother took her in a coach to Mr. Wathen's; she expressed pleasure from the ride, though unable to see, and in other respects her spirits were good. As soon as she returned, she complained of fatigue, and went immediately to bed. At seven in the evening she was seized with convulsions in her limbs, and now and then her features were distorted. At twelve o'clock that night the convulsions left her, and her senses returned, which had been lost during the fit. She now for the first time complained of pain in her head; which, she said, was very violent, and attended with a sensation of great weight. At nine o'clock on Tuesday morning, the convulsions returned, and continued until her death, which happened on Wednesday morning.

#### DISSECTION.

Thursday, July 4. Mr. Coleman and myself examined the body. On opening the cranium, a fracture was found on the orbital process of the os frontis, in which there was a hole, large enough to admit the point of the finger. In the dura mater, opposite this, there was a corresponding opening, with a portion of bone in it; between the membrane and bone, some extravasated blood was collected. In the pia mater and brain there were also openings; upon the former there were some purulent appearances, in the latter there was an incipient suppuration, with inflammation extending into the ventricle.

It now and then happens, that a blow, received upon the summit of the head, will produce a circular fracture of the entire cranium; commencing at the top of the head, passing down on each side through the temporal bone, and meeting at the basis. Mr. Chandler, late surgeon of this Hospital, admitted a case of this description, which happened by the fall of a shutter on the summit of the head; there did not appear to be any extravasation or concussion; great irritation and inflammation succeeded, which destroyed the patient; and after death it was discovered that there existed a complete circular fracture of the skull, and that the anterior portion could be freely separated from the posterior, from the vertex through the sphenoid bone. The skull is in the collection.

A curious fracture of the skull occasionally happens over the frontal sinuses. When the fracture is simple, if the nose be blown, the air escapes through the opening in the bone into the cellular membrane under the skin, and renders the forehead emphysematous. If, on the other hand, the fracture be compound, upon blowing the nose, the air rushes through the wound; so that in either case the nature of the accident may be easily ascertained.

Large portions of bone are sometimes detached from the skull, instead of being depressed; this was the case with a nobleman,

now living, who met with a very severe blow upon his head, from which he has perfectly recovered.

Fractures of the skull, if unaccompanied with concussion or compression, become united, as fractures of the bones in any part of the body, although more slowly. Here is a specimen, where a circular, or rather oblong, piece of bone was, as you may perceive, completely separated from this part of the *os parietale*, by the cut of a sabre, and yet it became reunited. Fractures of the cranium, therefore, easily unite. Where, however, large holes are made through the skull, the apertures do not in general become filled with ossific matter, but by a tendinous structure, formed from the *dura mater* and united to the *pericranium*. The holes made by trephining are thus filled, and not by bone. Also, when in fractures of the skull, where the bones are separated to any distance, the interspace will not become filled by bony matter, but remain open, as you see in this skull, which had been fractured and the broken part widely separated.

*The treatment of fractures of the skull* is as follows; when there is fracture, unaccompanied with symptoms of injured brain, you will not trephine; but you must, by the application of adhesive plaster, endeavour to heal the wound in the scalp as quickly as possible. Let your constitutional treatment be that of depletion, by means of blood-letting and purgatives. This plan removes symptoms of concussion, and even extravasation, which accompany these fractures; and often a few hours will show you that the application of the trephine, which you at first might have thought indispensable, is rendered unnecessary. It is wrong, therefore, to decide hastily in these accidents; for irreparable mischief might arise from your making an incision, and converting a fracture, which was simple, into one that is compound. Wait then for a time before you operate in such cases, for the purpose of seeing what effects may be produced by bleeding and purgatives. It not unfrequently happens, in these Hospitals, upon persons being brought in who have received injuries of the head, that the dresser in attendance will bleed them immediately after their admission, and send for the surgeon; before whose arrival the good effects of the loss of blood are apparent, and the symptoms of concussion, and even of extravasation, have lessened, so as to lead to a different view of the case. This shows how necessary it is that you should not be precipitate. If you act prudently, therefore, in these accidents, you will try bleeding and purgatives before you operate; and the depletion will prove of the greatest possible advantage in preventing inflammation: from which arises a principle danger.

*Fracture with depression.*—The next subject to which I shall direct your attention is, fracture with depression. I will tell you what you ought to do in such cases, and leave you to act for yourselves.

*Experiment.*—In order to ascertain the symptoms arising from

depression, I tried the following experiment: I applied the trephine to the cranium of a large dog, and took out a portion of bone. I then with the handle of a knife separated the dura mater from the bone; for I found that I could make no impression on the brain until I had done so, and then pressed upon it with my finger. At first the animal did not seem to feel it; but upon pressing more deeply, it produced pain and irritation, and he endeavoured to avoid it. Upon still increasing the pressure, he became comatose, and sunk on the table. I kept him in this state for five or six minutes; when, upon removing my finger, he got up, turned round two or three times from giddiness, and walked away apparently little worse for the operation. A gentleman who felt the animal's pulse during the continuance of the experiment, stated, that it became slower as the pressure was increased. In depression of the skull in man the pulse is the same—slow and labouring, and the breathing is often stertorous.

*Apparent depression.*—After blows have been received upon the head, it often happens that upon examining the scalp, there appears to be depression of bone to a great extent, when, in reality, there is none. Let me put you on your guard here in this respect. A person receives a blow on the scalp: the parts immediately surrounding the spot where the blow was received, swell from the extravasation of blood; but at the part on which the blow directly fell, the cellular membrane, having been condensed by the injury, will not receive the extravasated blood; thus the surrounding parts are considerably higher than the middle; and the character of the contusion is certainly calculated to deceive those who are unacquainted with the nature of these accidents. I have several times seen these appearances; but the first case which I recollect of fit in my own practice was that of a child brought into Guy's who had received a severe blow on the head from a brickbat. All present were prepared for the operation, fully expecting that I should apply the trephine; for they felt convinced that there was considerable depression of bone; and when I stated that I should not operate, they exclaimed, "Good God! I wonder what can be his reason." This child, after having been freely bled and purged, in two or three days recovered, and the appearance of depression vanished.

I have been often sent for by my dressers to these cases, and have been requested to bring my instruments with me; but upon examination have found that there was no depression of bone, and that the uneven appearance of the scalp was produced by the cause before mentioned.

It also very often happens in fracture of the cranium, that considerable depression of bone will happen from the external table of the skull being driven into the diploe, without producing the slightest injury to the internal table: do not, therefore, be precipitate in your diagnosis, nor hastily determine upon performing an operation which you might afterwards have reason to repent; these fractures,



however, can only occur in those of a middle age; for in the very young and in very old age, the skull is thin and without diploe. I believe in the course of my practice that I have frequently met with this accident, and we have many preparations in the Museum which clearly demonstrate their true character; but the three now before me are, I think, quite sufficient to satisfy your minds as to the existence of this state of the bone: here you see the external table has been driven in, and yet no vestige of fracture in the internal: here is another specimen, with greater depression; and the third still more than either, yet the internal plate is sound. I am not acquainted with the histories of these specimens; but it is evident that the persons recovered by the reunion that has occurred between the parts which were broken.

Suppose you are called to a patient who has had a severe blow on the head, and on examining the skull you find a portion of bone considerably depressed. You may still find this man capable of giving a history of the accident, and that his mind is not at all affected. On the other hand, you may be called to a person who has a fracture of the skull with depression, and who has lost the powers of his mind. If the fracture be simple, and there is no wound in the scalp, and no symptom of injury to the brain, it would be wrong to make an incision into the part, and perform the operation of trephining; for by making such an incision, you add greatly to the danger of the patient, as you may make what was before a simple, a compound fracture, and consequently greatly increase the danger of inflammation, which rarely follows fracture with depression, where the fracture is simple; but is a very frequent consequence of a compound fracture, which is produced by making an incision in the scalp. Never make an incision, therefore, when you can avoid it, or merely because there is a fracture with depression, if there be no symptoms of injury to the brain. Even if there be symptoms of injury to the brain, and the fracture be simple, do not immediately trepan. Take away blood, and purge your patient freely, and see how far the symptoms may be the result of concussion of the brain, and not of depression. If the symptoms do not yield to depletion, then, and not till then, perform the operation of trephining. I was called to a lady who had fallen against a projection in a wall, in walking across her parlour. The *os frontis* was driven in, but there were no symptoms of compression of the brain. I bled her, and guarded cautiously against inflammation, but there was no necessity for elevating the portion of the bone. This lady never had any symptoms of injury to the brain, and she recovered by depletion alone.

The old practice used to be, the moment an injury to the brain was suspected, and the least depression of the bone appeared, to make an incision into the scalp. This is putting the patient to considerable hazard; for the simple fracture would, by the incision, be rendered compound. In simple fracture, then, when it is attended with symptoms of injury to the brain, deplete be-

fore you trephine; and when it is unattended with such symptoms, though there may be depression, deplete merely, and do not divide the scalp, unless the symptoms have not yielded to depletion. If the fracture be compound, the treatment must be very different; because a compound fracture is followed very generally by inflammation of the brain; and it will be of little use to trephine, when inflammation is once produced. It might be thought that it would be time enough to perform this operation when inflammation had appeared; but this is not the case; for if the inflammation comes on, the patient will generally die whether you trephine or not; and you will not arrest its fatal progress by trephining, but the operation will add to the danger of increasing the inflammation. When inflammation of the dura mater and membranes of the brain has been excited by the depression of the bone, you scarcely retard the progress to death by performing the operation. These principles may be illustrated by many cases. In this Hospital I saw two instances: one in a patient of Mr. Cline, and another in a patient of Mr. Birch. Mr. Cline's patient was a man who had compound fracture from a blow on the head. A portion of bone had been depressed, and Mr. Cline advised him to submit to the operation of trephining. The man said, "You may do what you like; I am no judge, but you are; so do what you please with me." Accordingly he walked into the operating theatre to be trephined; the portion of bone was removed; he walked back again to bed, and never had a bad symptom.\* A short time after, a patient under Mr. Birch, with fracture and depression, was told that he was in a similar danger, and advised to undergo the same operation. He was, however, self-willed, and obstinately refused to

\* *Case.*—February, 1823, John Mahoney, æt. 30, an Irish labourer, was brought into St. Thomas's Hospital, having been struck by the end of a bar of iron on his head: the blow stunned him for a few minutes. On examination, I found a compound fracture of the right parietal bone, a little above its centre, with depression of the fractured portion, in extent about the size of a crown piece, the greater part of which was below the inner table of the sound bone. The patient was perfectly sensible, and only complained of slight pain at the seat of the injury. He walked into the operating theatre, where I removed the whole of the depressed part of the bone, which was much comminuted. The dura mater was sound, and the hæmorrhage very trifling. After the operation, he was freely purged, was ordered low, light diet, and kept very quiet, and merely cold water applied on linen to the wound. He rapidly recovered, without any bad symptom, and was discharged at the end of ten weeks, with the wound perfectly closed; but the pulsation of the brain could be distinctly felt, as soft matter occupied the place of the bone which I had removed. During the progress of the cure he was only bled three times.

He wears a metal plate over the part at which the bone is deficient, but this is gradually becoming firmer, and the pulsation less distinct.

*Case.*—Timothy Desman, æt. 22, an Irish labourer, was admitted into St. Thomas's Hospital, August 31, 1824. He had been struck with a hammer by accident on the superior part of the frontal bone to the left of the median line. The blow had produced a compound fracture, with depression, in extent about the size of an half-crown. He was perfectly sensible, and said he only felt a soreness at the injured part. I removed the whole of the fractured bone,

submit to the operation. Several days after the accident he was seized with pain in the head, and symptoms of inflammation in the brain; and when he became insensible, the operation of trephining was performed; but it did not arrest the symptoms, and he died of the inflammation. In Guy's Hospital two boys were admitted under very similar circumstances. The os frontis had, in one case, been broken by a kick from a horse, and in the other by a fall on the forehead. In one case the portion of bone was raised, and the boy did well: but the mother of the other boy interfered to prevent the operation of trephining; and though it was performed after symptoms of inflammation had appeared, he died. It is true, it happens, that fracture with depression is sometimes not followed by inflammation, even when the fracture is compound; but we cannot be certain of this; and if it ensue, we cannot save the patient by trephining at a late period. The rule, therefore, which I always follow, is this: When I am called to a compound fracture, with depression, which is exposed to view, whether symptoms of injured brain exist or not, I generally use an elevator, and very rarely the trephine. I put this instrument under the bone, raise it, and if it has been comminuted, remove the small portions of bone. The elevation of the bone is not followed by any mischief; but if you do not raise it, and inflammation follows, it will be too late to attempt to save the life of the patient.

It sometimes happens, in fracture of the skull, attended with depression, that a small spicula of bone will project into the brain, so as to produce and support epileptic symptoms. A negro had received a blow on his head with a hammer. He was taken into St. Thomas's Hospital, having epileptic fits, and he had the appearance of a very slight depression on his head. Mr. Birch, whose patient he was, trephined him; and as he was raising the bone, which was effected with great difficulty, the man had a violent epileptic fit. The bone seemed attached to the dura mater, and upon looking upon the inner table of the portion which had been removed, a small thorn of bone projected from it, which pierced the dura mater, and which had been produced by the inflammation following the accident, which happened four years before the operation. The dura mater was thickened around the little process of bone. The man recovered, and had only one fit afterwards.

*Mischief of depression, not immediate.*—The mischief of depression is not, however, always immediate; the patient sometimes recovers from the first symptoms, but is thrown, by any hurried cir-

which was comminuted, one small portion had penetrated the dura mater. He has since been treated exactly as the former patient was, and has not had a bad symptom since. (Sept. 20.) He has been bled twice.—T.

The appendix contains the following note —

Since the case of Desman has been printed, symptoms of inflammation of the brain came on, in consequence of which he died. On examination of the head, a large abscess was found in the right hemisphere of the cerebrum.—T.



ulation, at a subsequent period, into a new train of effects, which still require surgical assistance; and it is upon that account, if there were a wound, and I felt much depression, that I would immediately elevate the bone; but if no wound, I would wait the production of symptoms.

In illustration, I shall mention some very interesting cases to which I wish particularly to call your attention.

*Case.*—Sir David Dundas was called to attend a person who, by a fall from a ladder (six weeks previous to Sir David's seeing him,) had a fracture, with considerable depression of the skull. The patient had become insane, so that it was necessary to confine him by means of a strait waistcoat, and he had hemiplegia on the opposite side of the body to the seat of injury. So much time had elapsed from the accident, that the depressed portion of bone had become reunited to the cranium. Sir David immediately trephined him, taking away the depressed portion of bone. On the day following, his insanity was so far diminished, that the strait waistcoat was removed, as he did not require any further restraint. In a fortnight the hemiplegia disappeared, and all his unpleasant symptoms subsided.

*Case.*—Mr. T. æt. 31, a private in the Newbury Volunteer Cavalry, had been dining at Newbury with the troop, to celebrate the coronation of his present Majesty. When returning home at a late hour with some others of the troop, they were attacked by a number of the Queen's partisans, and during the fray which succeeded, Mr. T. received a violent blow from a brickbat on the superior part of the frontal bone, which caused a depression of a portion of the bone, and considerable hæmorrhage. Mr. Hemsted, surgeon, at Newbury, was sent for to attend him, and directed that he should be freely bled and purged; which relieved him so much, that at the end of four days he returned home apparently well. Mr. Hemsted, however, told him he would be very fortunate if he felt no further inconvenience from the accident, and advised him to keep particularly quiet and sober.

On the 20th of January 1822, exactly six months from the receipt of the injury, he had an epileptic fit; Mr. H. was called to visit him, and recommended the same plan of treatment. The fits, however, returned once or twice every fortnight; and oftener, if he exerted himself, or was guilty of any excess. Mr. H. told him, that he could not be cured without having the depressed portion of bone removed; to which he was averse, and came to town to consult me, when I confirmed the opinion of Mr. H. The patient still refused to undergo any operation at that period. The fits increased in frequency; and on the 30th of July 1822, having had two, he became much alarmed, and sent for Mr. Hemsted to remove the portion of depressed bone, which Mr. H. did with a trephine. He speedily recovered from the operation, and has not since had any return of the epileptic fits.

Another circumstance I shall mention; and whether we regard

it in a physiological or surgical point of view, it is perhaps one of the most extraordinary which ever occurred; and as connected with surgery and physiology, I am surprised that it has not made a greater impression on the public mind than it appears to have done.

*Case.*—A man of the name of Jones was admitted under Mr. Cline, on the 9th of May, 1800, into St Thomas's Hospital, from Depford, where he had been seen by Mr. Nunn Davie, apprentice to Mr. Chandler, who advised that he should be sent to the hospital. When he was brought to the hospital, and placed under the care of Mr. Cline, he was, in a great degree, destitute of sensation, and of voluntary motion; his pulse was regular; his fingers were in constant flexion and extension, nearly corresponding in frequency to his pulse. He had a depression near the superior edge of the left parietal bone. When hungry he was wont to grind his teeth; when thirsty to suck his lips; when he had occasion, or want to evacuate his fæces and urine, he moved about in his bed: but he could sit in the chair, when he voided them. Mr. Cline trephined him, removing the depressed portion of bone, and he made a noise of complaint during the operation. The motion of his hands ceased during the operation, and the pupils of his eyes were directed forwards. At four o'clock that afternoon (the operation having been done at one) I found him raised in his bed; and when I asked him if he was in pain, he put his hand to the wounded part of his head. The next day he could say yes and no, but had still a stupor. He gradually recovered; and when questioned as to the last thing which he remembered, it was taking a prize in the Mediterranean the year before; and he was found in a state of insensibility in June 1799: so that he had lived a year unconscious of his existence. He was discharged cured from the Hospital, on the 10th of July. The exact mode in which his accident had happened I could not learn; but he was found on board his ship in a state of insensibility, and was taken to Gibraltar, and to Depford, in this state of deprivation of mental faculties and bodily power.\*

It appears, therefore, that in cases of depression, we should not be prevented from trephining, however distant the period may be at which the accident occurred, if there be no inflammation; and the patient may, after a great interval, be restored to the powers of body and mind.

\* Mr. Cline may, perhaps, be able to add circumstances which I have omitted in the relation of this case.

## LECTURE XII.

## ON WOUNDS OF THE BRAIN.

WOUNDS of the brain frequently happen without immediately producing any interruption to the operations of the mind. But should the wound be accompanied by either compression or concussion, then the particular symptoms which characterise those injuries will be present. If, however, the wound be a simple incision or laceration, it does not produce symptoms until inflammation succeeds. Indeed, considerable portions of the brain are lost, and yet the mental and bodily functions continue unimpaired. Epileptic fits and himiplegia certainly sometimes directly follow such injuries; but, on the other hand, brain to a great extent has been lost, without considerable disturbance of either the mental or corporeal functions; numerous cases of this description are upon record; several have fallen under my own observation.

*Case.*—Mr. Davie, an apprentice of the late Mr. Chandler, came to me when I was in the Hospital, and said, “Look here, Sir,” at the same time showing me a portion of brain, with a piece of pia mater attached to it. I went to see the man, and found the representation of Mr. Davie correct; there was a long transverse fracture in the os frontis, through which a portion of brain protruded. His mind was not at all affected; neither were the bodily powers in the least disturbed; no bad symptoms of any kind followed the injury; the wound healed most favourably by adhesion, and he was soon discharged from the hospital. About a year afterwards, while I was at the house of a lady in the city, whom I was attending, a man walked into the room, and said to me, “How do you do?” Not recollecting him, I looked at him with some surprise, when he informed me that he was the man whom I had seen before in St. Thomas’s Hospital, with a wound in the head, and through which he had lost some of his brain. He stated, that he had been quite well ever since; he had a depression at the part where he received the wound; was not subject to fits; and it was certain his mind had not sustained any decided injury from the accident, for he was at the time I saw him conductor of an extensive business.

It occasionally happens, when a portion of brain has been lost, that a piece of the cranium will, by being driven in, occupy its place; and if in these cases no symptoms of compression manifest themselves, you must not elevate the depressed bone; for where you do so, you would, in all probability, give rise to extravasation, or increase the hazard of inflammation. The late Mr. Chandler had a patient in this Hospital who, on receiving a blow from a boat hook upon the parietal bone, had a portion of that bone driven into the brain, and at the same time a quantity of the brain was lost; at first there was hemiplegia. The depressed bone was permitted to remain, and the individual recovered.



*Danger attending wounds of the brain.*—The danger attending these injuries of the brain arises principally from two causes: viz. inflammation, and the formation of fungus. 1st. Inflammation; and 2d. Fungus; but both of these may be conquered by prompt and scientific measures.

When the brain receives a wound, you must commence your curative exertions by abstracting as large a quantity of blood from the system as the constitution of your patient will bear; not, however, to such an extent as to prevent the restorative operations of nature. Do not lower the system to such a degree as to prevent inflammation altogether, as was done by the dresser in the other Hospital, whose partiality for bleeding I mentioned to you. Though you succeed in keeping down inflammation, yet fungus will arise, and here is a preparation of the disease to which I allude. Sometimes wounds of the brain extend even to the ventricles, and you observe, that one of the lateral ventricles was opened by ulceration.

*How restored.*—Usually some days after the brain has been wounded, the divided parts begin to unite by the adhesive inflammation; if this process cannot effect a cure, granulations form, which, at length, project through the opening of the skull, and give rise to the fungus before mentioned. Upon proper treatment the safety of your patient depends. If you do not repress the growth of the fungus, there will be violent constitutional irritation, and the life of the person will be destroyed; but, on the contrary, if you attend to the condition of the wound, and prevent the fungus from rising, you will succeed in effecting a cure.

*Treatment of fungus of the brain.*—The treatment is as follows. You are to apply to the fungus a piece of lint, wetted by liquor calcis; and over this a strap of adhesive plaster; when you examine the part on the following day, you will find the fungus considerably diminished; you are then to use a thicker piece of lint, and the strapping as before; pursuing this plan, you at length bring the fungus to a level with the scalp; but this is not sufficiently low for your purpose; therefore, you must proceed until you have succeeded in getting it on a level with the bone, in which position it must be cautiously preserved, when at last the scalp heals over it, and your object is accomplished. It is sometimes necessary to apply caustic to the fungus. I have witnessed several of these cases in our Hospitals. Formerly it was the practice in the treatment of these diseases to remove the bone contiguous to the fungus, and which, of course, rapidly increased until the patient became destroyed. The plan of treatment which I have just recommended to you is unquestionably the best; viz. that of repressing the growth of the fungus until the scalp heals over it. This will be well illustrated by the following cases:

*Case.*—John Dent, a boy, aged eleven years, on the 9th of December 1803, received a severe blow from the kick of a horse, on the anterior and inferior part of the right parietal bone, by which

he was stunned. The same evening he was brought into St. Thomas's Hospital in a state of stupor, with a considerable tumour under the scalp. A longitudinal incision, to the length of two inches, was made, when immediately a portion of brain made its escape, about the size of a small hazel-nut; and upon introducing the finger, a fracture was distinctly felt, yet no depression was evident; but on the further division of the scalp in a transverse direction, and turning back the edges, a very considerable depression was distinguished; in consequence of which the trephine was applied, and one angular piece of bone removed by the metacarpal saw; also another piece, rather more than an inch in length, which was driven into the substance of the brain, was extracted with the forceps. During the operation, small quantities of brain were escaping continually with the blood: supposed to be about ʒij or ʒiiss. Every depressed portion of bone being now sufficiently elevated, the wound was dressed superficially, and, notwithstanding the great degree of stupor and insensibility he laboured under prior to the operation, his senses returned before Mr. Chandler (who operated) quitted the theatre, and from this time he appeared perfectly tranquil. The next morning he was ordered the common aperient medicine of the house, which was occasionally repeated. The wound was not dressed until the 4th day; when, upon the removal of the dressings, there appeared a disposition to fungus, arising from the brain, which continued to increase for about a fortnight: moderate degrees of pressure were had recourse to for its removal, but without success. Mr. Chandler then requested that the lint (with which it was previously dressed) should be dipped in lime water, and the same degree of pressure made use of as before. His plan had not been persisted in for more than ten days, before every particle of fungus disappeared; but it was observed, a short time afterwards, that the edges of the wound assumed a glossy appearance: they were, therefore, touched over slightly, every other morning, with the sulphas cupri, which occasioned the wound to contract daily. and by the latter end of February it was completely cicatrized: on account of losing so large a portion of bone, the brain could be distinctly seen pulsating through the scalp. He lost no blood from his arm during the cure, nor did there any bad symptoms occur.

*Case.*—George Freeman, aged eighteen years, was admitted into St. Thomas's Hospital, July 2d, 1811, under the care of Mr. Birch, having a fungus tumour arising from the brain. The history of the case was as follows: Seven weeks before, while he was grazing a horse near Tunbridge Wells, he fell asleep, during which time the horse (he supposes) trod upon his head; the blow rendered him senseless, and he remained in this state, till he was found by some men, and conveyed home. Immediately after the accident, May 20th, upon his being put to bed in a comatose state, he was bled largely from the arm; and in the evening, remaining in the same state, also having a great deal of swelling on the scalp, the cupping glasses were applied, of which he was sensible.

On the following morning a crucial incision was made through the whole of the swelling, from which there issued a portion of blood and brain. A large piece of the os frontis had penetrated through the dura mater, nearly an inch into the substance of the brain, which being removed, he became perfectly sensible when spoken to, and so continued; but the fæces and urine passed away involuntarily. Every thing appeared to do well, until the fungus cerebri\* made its appearance, and gave much trouble; it was repeatedly cut away, and pressure applied; which not only produced great pain in the head, but occasioned sickness and vomiting, which immediately ceased when the pressure was removed. About the 15th of June he lost his appetite, became very sick and faint upon the least exertion; when the bark was given to him, and continued till he left the Wells.

When admitted into St. Thomas's Hospital, there was a considerable loss of bone, on the os frontis, over the right eye, where the pulsation of the brain was evident. A fungus swelling, in a sloughy state occupied the middle of the wound which was surrounded with red fleshy granulations; and when the tumour was pressed on, he complained of severe headache, which ceased on removing the pressure. On the day following his admission I was desired to see him; and I immediately cut away the projecting part of the fungus, and recommended pressure to be made on the part by means of a bandage, applying to the wound a pledget of lint, wetted with lime water. No other treatment was found necessary; by these means the fungus was kept down; the ulcer gradually contracted, and on the 9th of August it was nearly skinned over, without one bad symptom occurring during the cure. He always complained of headache when the bandage was applied tight. He took no medicine while in the hospital.

*Case.*—Mr. Henry, jun. of Keswick, was struck on the forehead by a portion of a small brass cannon, which burst while he was firing it; he was immediately afterwards found in a senseless state, but was in a few minutes able to rise and speak. Mr. Edmondstone, surgeon, was called to see him, and arrived ten minutes after the accident; he found a wound over the left eyebrow, which he enlarged, and then discovered a comminuted fracture of the skull: the fractured portions of bone were loose, and detached; the dura mater was lacerated, so as to allow of the escape of about a tea-spoonful of the substance of the brain. The loose portions of bone were removed, and the wound dressed. Soon after the operation he was sick; and his pulse being hard, he was bled twice in the following night. On the next day some more brain in small quantity was removed with the dressing. A fortnight after the accident a fungus arose from the brain, which was treated by the pressure of lint, dipped in lime water, which considerably repressed its growth. Whilst pursuing the above plan of treatment, he one day complain-

\* These were exuberant granulations from the cerebrum.



ed of severe pain in his neck, for which he was bled freely; when in a few hours after, the fungus suddenly decreased, and soon entirely disappeared. The wound healed in fourteen weeks, and he has since remained well.

#### REMARKS.

I observed a circumstance in this young gentleman, after his cure, which shows the influence of mental excitement in agitating the brain, and in increasing, upon the instant, the quickness of its action. Something passed in conversation which displeased him; and his brain, which could be distinctly seen beating through the opening in his skull, immediately quickened from 80 to 120 in the minute: struck with this appearance, I watched it for a few minutes; and as his mind became calm, the pulsation gradually sunk again to about 80. He had a great dislike to, and apprehension of, the finger being applied to the injured part; and as soon as I touched it he receded from me, and I saw his brain beating with extraordinary velocity. These circumstances strongly impress a conviction of the influence of mental and corporeal excitement, and of the necessity which exists of guarding against the one and the other.

#### OF INFLAMMATION OF THE BRAIN.

I shall now speak more particularly of the inflammation which follows injuries of the brain, in which their chief danger consists.

*Symptoms of inflammation.*—Upon the first approach of inflammation, the person complains of great pain in the head, very quickly falls into a comatose state, and when roused from this condition the pain is excessive; the scalp around the external wound becomes œdematous; and if you press upon it, the impression of the finger is retained; the surface of the wound has a shining glossy appearance, and from the wound itself is discharged a fluid, of a sanious colour; the edges of the wound have a sloughy appearance; the countenance is very much flushed, the eyes are red, the skin is hot, and the carotid arteries beat with very great force; so much so, that if the collar of the shirt be open, you can see the pulsation of these arteries at some distance from the bed; this circumstance of itself would be quite sufficient to convince you that there was a great determination of blood to the brain. Next the patient is seized with rigors, and these follow in very quick succession: hemiplegia often attends, and is generally situated on the opposite side of the body to that of injury to the brain. Violent convulsions of that side of the body occasionally occur; the patient remains in a comatose state, but when roused will give (until towards the very close of life) rational answers to such questions as may be put to him. These, then, are the ordinary symptoms of inflammation of the brain arising from wounds of that organ.

*Formation of matter and its situation.*—If the inflammation ter-

ninates in suppuration, the matter will be situated, either between the dura mater and skull, pia mater and tunica arachnoides, pia mater and surface of the brain; or, lastly, in the brain itself.

*Between the skull and dura mater.*—When pus is situated between the dura mater and skull, trephining for its removal is attended with success; but it is comparatively rarely there, as it is generally situated between the pia mater and surface of the brain, for which an operation will be useless.

Another situation in which matter has been found is in the longitudinal sinus of the dura mater.

*Case.*—Mrs. P. aged twenty-two, was admitted into St. Thomas's Hospital on the 23d of June, on account of an affection of the head. Sixteen months previous to her coming to the Hospital, she had received a blow on the forehead from falling against a chest of drawers. This caused a small wound, with considerable contusion, which soon disappeared by the application of a spirituous lotion; but still she had some pain and a sense of weight in the head: this increased, and at the end of eight months was extremely severe, and she had epileptic fits. She was shortly afterwards much relieved by a discharge of a purulent character from the nose and ears, which continued three days, when it subsided, and the symptoms again became as violent as ever, but were again diminished by a second similar discharge; this occurred repeatedly, but she did not experience any permanent relief, as the symptoms always returned when the morbid secretion stopped. Having tried numerous remedies without procuring ease, she applied at St. Thomas's Hospital, and was admitted under the care of Dr. Blane,\* and received so much benefit from the treatment he adopted (which consisted of blisters and opiates chiefly) as to be able in six or eight weeks to quit the Hospital. Shortly after her dismissal, however, the old train of symptoms re-appeared as violently as before, and she came into the hospital a second time, when she had entirely lost her appetite, was very thirsty, had most distressing pain in her head; she slept but little, was extremely restless and irritable, so much so that any sudden disturbance caused convulsions: the pain was chiefly confined to the part on which she had received the blow, and pressure on this spot gave rise to great uneasiness. The former plan of treatment was adopted without affording her any relief, and she evidently got worse, being at times quite comatose. A crucial incision was made into the scalp by Mr. Birch, to ascertain if any disease of the pericranium or bone existed, but not any was discovered. When this wound began to discharge, the symptoms were, in a degree, relieved. The discharge was, at first, healthy; but after a short period became fœtid; the pericranium separated, and exposed a carious state of the subjacent bone. She continued in this state for a considerable time, when it was discovered that some pus escaped through a carious opening in the

\* Now Sir Gilbert Blane, Bart.

bone, which was evidently influenced by the pulsations of the brain: the trephine was, therefore, applied, and a portion of bone raised to allow of a more ready escape for the pus; little appeared, but the dura mater was found highly inflamed, and had a gangrenous hue. After the operation she got worse, and expired early the next morning, about nineteen months after the receipt of the injury.

#### DISSECTION.

The dura mater opposite the wound was in a sloughy state, and on opening the longitudinal sinus a long abscess was found, which contained about two drachms of matter. The brain itself appeared sound.

This is the only example of the kind I have witnessed.

*Between the pia mater and brain.*—The next part in which matter is situated is between the tunica arachnoides, pia mater, and brain itself. This last is the usual place, and in this case the matter is diffused over the hemispheres of the brain, in the same manner as I mentioned to you the other evening blood is, when extravasated on that organ. When the matter is seated between the pia mater and brain, it will be of no use to open the dura mater, as very little will be discharged, there being no communication between one part and another; for the matter is contained between the vessels which pass from the pia mater and brain.

*Case.*—December 23, 1815. A driver belonging to the royal artillery, was kicked on the forehead by a horse, and was taken up perfectly insensible. On examination, a wound was found, with considerable fracture and depression of the frontal bone, immediately above its sinuses. He was taken to the general Hospital, where the surgeon on duty, after enlarging the wound to ascertain the extent of injury, raised the depressed portions of bone, and removed several which were completely detached; the dura mater was lacerated, and some small portion of brain escaped during the operation. In the evening he appeared tranquil, and his bowels were freely open. 24th. Had passed a quiet night, was sensible, and felt comfortable. Purgatives ordered. He continued to go on well for several days. On the 28th, a fungus of the brain protruded through the wound, and gradually increased. On the 2d of January, he complained of pain in his head, and moaned a good deal. 4th. The fungus having protruded more, a consultation was held, and it was determined that a ligature should be applied to its base, as pressure produced immediate loss of sensation. The portion of brain removed by the ligature was of a dark colour; very slight hæmorrhage followed. On the 6th, another ligature was applied, and on the following night a considerable bleeding occurred. The fungus continued to protrude in spite of the ligatures: he became insensible; slept continually; did not take notice when roused, and gradually sunk, expiring on the morning of the 14th.



## DISSECTION.

Some portion of the inner table of the frontal bone was depressed; a quantity of pus was situated beneath the dura mater, near the seat of injury. The fracture extended through the petrous portion of the temporal bone to the foramen lacerum. The right hemisphere of the cerebrum was in a soft state, and appeared to have been lacerated. Another collection of pus was found under the longitudinal sinus of the dura mater.

*In the substance of the brain.*—The next situation in which matter is found is in the substance of the brain itself. It is lodged in various parts, and the only circumstance very curious in this complaint is, that you would not suppose, from the symptoms, that matter was forming; they are those of compression rather than irritation. If the membranes of the brain be attacked with inflammation, symptoms of irritation will be present; but if the brain itself, they will be those of compression; and the circumstance which surprises a person who examines the brain of an individual, in which matter has been formed, is, that so little constitutional irritation existed during its formation.

*Case.*—Mary Harris, æt. 16, was admitted into Guy's Hospital, under the care of Dr. Marcet, having a constant severe pain in her head, which she referred chiefly to its fore part:—three months before she had fallen down a staircase and struck her head. She was quite sensible, and her intellectual faculties were unimpaired. She mostly kept her bed; was inclined to be comatose, but could be easily roused: had no appetite or thirst, and the attempt to take food frequently occasioned vomiting. Some time after her admission into the Hospital, she died suddenly, being much convulsed, and her breathing stertorous for two hours preceding her death.

## DISSECTION.

Two abscesses were found in the right lobe of the cerebellum, one containing about 5ij. the other 3ss. of matter. Some slight serous effusion existed between the pia mater and tunica arachnoides. The dura mater adhered very firmly, and appeared more vascular than usual.

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*Case.*—A boy, 13 years of age, fell from a scaffold, on which he was playing, and fractured the left parietal bone. On examination it was found, that not only a fracture of considerable extent existed, but also that portions of bone were driven through the membrane into the substance of the brain. The trephine was immediately applied, and as many portions of the depressed bone were removed as could be readily found. The brain was found much lacerated, and there was a partial loss of motion on the op-

posite side of the body. The patient was now put to bed, and continued for seven days without any bad symptoms, except the loss of motion on the right side of the body. He rested well, and his appetite was good. On the eighth day, however, the loss of motion on the right side of the body became complete; but at the same time there were very painful sensations in it. He was often supplicating the nurse to rub his arm: he began to lose his appetite: his pulse became quick and weak; and fungus granulations were observed to sprout from the wound, from which there was also a considerable discharge. His appetite continued bad for some time, and his pulse was quick and weak; but then these symptoms vanished, giving way to appearances which indicated less danger; that is, his appetite returned; his pulse became fuller; he did not complain so much of pain in the right side of the body. These favourable symptoms were but of short duration; but although he became more irritable, he remained perfectly sensible. The symptoms continued thus alternating for the space of a month, sometimes giving hopes of recovery, at others producing apprehensions of a speedy dissolution. At length his pulse became exceedingly quick, and so weak as to be scarcely perceptible: the discharge was more considerable: the fungus sloughed, and another formed; and within two days of five weeks after the accident, he expired.

#### DISSECTION.

The dura mater was found to adhere to the left hemisphere, in which a considerable opening was found, leading into a large cavity: at the superior part of this cavity was situated a detached portion of bone. This cavity was an abscess, which probably had been formed from the irritation of the portion of bone; it extended downwards into the ventricles, which it had ulcerated, and which were found very much distended with pus. The opening of communication between the ventricles was much dilated; the surface of the brain, through every part, had considerable marks of inflammation, and purulent matter had been effused between the folds of the pia mater.

There is a curious specimen in the collection, taken from a child which I had under my care, and on whom I performed the operation of trephining. A young child was playing in a yard where there were some fowls feeding, when it received a wound on the head from the beak of a cock. The mother, hearing the child shriek, ran to the spot, and found that there was a small wound of the scalp, and, thinking there was no serious injury, she bound it up; but, a week afterwards, pain in the head came on, together with great constitutional irritation, and the child was brought to me. On examining the head, I found that a circular wound had been made in the bone, and that matter issued through the opening; I said to the mother, if the child is not better to-morrow, bring it to me, and I will make a more free opening for

the discharge of the matter. The next day the child was brought to my house, and I performed the operation of trephining, when I found there was an opening in the dura mater and pia mater corresponding to that in the bone; the symptoms of irritation was relieved by the operation, those of compression still continued, and in three days the child died. On examining the part after death, I found there was a circular wound in the dura mater, the edges of which were hardened and thickened, and as you see in the preparation, a similar wound of the pia mater and brain, in size corresponding to the external opening, and an abscess between the pia mater and brain. At that time I had no idea that a wound of the description I have just mentioned could be produced by a bird of this size; but since that period I have seen an instance of a similar kind; an Indian pheasant made a dart at a child, which was playing near it as it fed, and struck a hole into the superior maxillary bone, just below the orbit.

I shall mention two more cases of wounded brain, which are extremely curious and interesting.

*Case.*—Master C. W. aged 12 years, received a wound on the left temple from a slug, about the size of a pea, which was discharged from a spring gun. He bled profusely, vomited, and was inclined to stupor; but, on being roused, appeared aware of the persons about him; his pulse was small and tremulous; his countenance swollen and pallid; and the skin bedewed with a cold moisture. On being undressed he made free use of his limbs in extricating himself from his clothes; but in a few hours after, all the symptoms of compression came on; for which purgatives, bleeding, blisters, and cold applications were had recourse to. Two days after he became paralytic on the right side, when the wound was enlarged to ascertain the extent of injury; an opening was found in the temporal bone, just above the zygoma, and a portion of brain appeared at the aperture, about the size of a large pea; but there being no depression, the wound was closed, and the former remedies persevered in. By degrees the coma and other symptoms subsided, and although the intellectual energy may be said to be quite recovered, yet the paralysis continues.

Previous to the accident, the young gentleman had suffered severely from enteritis, followed by glandular enlargement and suppuration. Perhaps, to the weakened state of his health at the time of the injury, together with the large quantity of blood he lost in the first instance, and the active treatment subsequently preserved in, is to be attributed the favourable termination of this case, where a foreign body had entered, and in all probability is still lodged in the substance of the brain.

*Case.*—Mr. Thompson was admitted into St. Thomas's Hospital, at two o'clock on Friday afternoon, having been wounded in the head by a pistol shot. The left temporal bone was fractured, and there was a wound in the scalp over the parietal bone; but no communication could be discovered between it and the wound over



the temporal bone. Mr. Travers shortly after saw the patient, and found it necessary to dilate the wound; to enable him to raise the depressed bone, of which he removed five portions. There was a considerable bleeding from beneath the bone, but the dura mater appeared uninjured. The wound was dressed, and the patient ordered to be kept quiet. There was some oozing of blood from the left ear; and the patient, although confused and agitated, gave rational answers to any questions put to him. At five o'clock he took some castor oil, but immediately brought it up again, and vomited repeatedly after. About half past nine he suddenly jumped out of bed, and complained bitterly of the restraint put upon him; but was again placed in bed. At ten he complained of thirst, and called incessantly for water; two hours after, his pulse having become quick and hard, he was bled from the arm; this was done with much difficulty, as he resisted powerfully; in less than two hours the pulse could scarcely be felt at the wrist, his extremities were cold, his pupils dilated, and his breathing stertorous. At two o'clock he again became almost unmanageable, and coma appeared to be rapidly increasing; but he still answered questions rationally, when roused: he now dosed until four o'clock, but was very restless; at which time some hæmorrhage took place from the wound, and he was quite insensible. His pulse became very feeble and hurried, his pupils dilated and quite insensible to light, and he continued in a state of torpor until twelve o'clock; when, contrary to all expectation, he again in a degree rallied; his pulse rose, the body became hot, and he was excessively restless; half an hour after he had several convulsive fits, and then became so composed as to take a cup of tea; but again suddenly relapsed into a state of stupor. About two o'clock he had some more convulsions, foaming at the mouth, and making frequent exclamations; he became so violent that the strait waistcoat was applied; this continued until five o'clock, when he became more quiet and perspired profusely; he then gradually got weaker, had subsultus tendinum, and the right side was paralysed; subsequently he had strabismus, the countenance was horridly distorted, and he occasionally struggled violently; a frothy mucus was discharged from the mouth and nostrils, the pupils became very much contracted and fixed, and at half past two o'clock he expired.

#### DISSECTION.

The fracture extended from the temporal bone in one direction into the orbit, in another to the sagittal suture, and in a third to the mastoid process; several loose portions of bone were found on the dura mater, which was discovered to be lacerated. On raising the upper part of the cranium, a quantity of soft brain issued from the wound. The dura mater was much inflamed: particularly on the left side and posterior part. Under the dura mater was a collection of dark-coloured serum, and a layer of extravasated blood

over the left hemisphere. The substance of the brain, on being cut into, exhibited numerous red points. The ball was found in the anterior part of the middle lobe of the left hemisphere, the brain around it was soft and of a dark colour. The vessels in all parts of the brain and its membranes, were extremely turgid.

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*Time at which inflammation occurs.*—The time at which inflammation of the brain supervenes, after the injury has been received, is generally about a week, rarely less than that time; and this it was that led me to say, on another occasion, that inflammation of the brain was more slow in its occurrence than that of most other organs. It often happens that inflammation of the brain does not come on till a fortnight or even three weeks after the injury. Every surgeon who has written on the subject puts his reader on his guard about the distance of time that complaint supervenes after the accident; he tells you the patient is not safe till two or three weeks afterwards. If you read the works of Mr. Pott on the injuries of the head, you will find the circumstance mentioned; and in the work of Mr. Dease, of Dublin, it is distinctly stated, that inflammation of the brain is occasionally postponed to three or four weeks after the accident occurs, and even then the patient is not safe.

*Case.*—I will give you a case relating to this subject. Dr. Babington and myself were sent for to see a person, a clerk to the firm of Whitbread and Co. who, whilst riding on horseback, (being a short-sighted man) struck himself violently against the bough of a tree, and was brought to the ground by the force of the blow. He was taken to Croydon, where Dr. B. and myself visited him. We found that he had been struck on the os frontis, just above the frontal sinuses, where there was a depression; and this was the first case in which I witnessed emphysema of the forehead produced by b'owing the nose. We took all possible care of the patient, bled him, regulated his diet, &c. till the inflammation had subsided. He came to town three weeks after the accident; and about three months afterwards, he asked whether he might go to Rochester to spend a little time with some friends: we told him that he might, if he would pay attention to himself, keep his bowels open, and regulate his diet. After the lapse of a few days, he became extremely ill with inflammation of the brain, and he died. On inquiry, we found that he had neglected the directions given him, and allowed his bowels to be costive.

The following case also shows the necessity of keeping the patient from any exertion.

*Case.*—On the 8th of June, the son of Mr. J. S. fell from a ladder on some spikes, one of which penetrated his skull. The wound bled freely, and a considerable portion of the substance of the brain came away, also several portions of bone, when the

wound was enlarged to ascertain the extent of injury: he was insensible at times for several days after the accident. On the 27th, he walked a mile to the house of his medical attendant, Mr. Bethune, of Brighton, and appeared in a very favourable state for recovery. He had been particularly cautioned as to the necessity of his refraining from all kinds of exertion. On his return home, his brothers were playing at cricket, when he imprudently and unfortunately joined them. Inflammation of the brain was the consequence, of which he died in two days.

It always requires great care when there is considerable depression remaining after an accident: and I will mention to you an instance of this kind, which will show you the necessity of enjoining a patient in this state strict attention to his mode of living. A man, who had received a wound in the head from a pistol shot, came to this Hospital: the wound healed kindly, but the depression remained. Whenever this man indulged even in the moderate use of spirituous liquors, he used to have violent pain in the head, which was only relieved by blood-letting.

*Treatment of inflammation of the brain.*—As to the treatment of inflammation of the brain, it is the same as is required for inflammation in general; with this exception only, that the blood should be drawn from the temporal artery in adults, and the jugular vein in children: by these means you abstract blood more readily from the part: even in adults you may, after opening the temporal artery, if the symptoms be not relieved, bleed from the jugular vein. In addition to this treatment, you purge, produce perspiration, and apply blisters to the head. I have seen poultices applied to the scalp, containing stimulating applications, of considerable use. The patient is to abstain from every species of stimulus.

#### OF THE OPERATION OF TREPHINING.

This operation will be required under the following circumstances.

1st. Where there is extravasation of blood between the dura mater and skull.

2d. In fractures of the skull, with symptoms of compression continuing after depletion.

3d. In simple fractures with depression and continued symptoms of compression.

4th. In compound fracture with depression, unattended with symptoms of compression, it is best to trephine, or to raise the depressed bone by the elevator.

5th. When matter has formed.

It generally happens in these last cases, when matter is seated between the dura mater and skull, that there is fracture: and this is an indication of the seat of the injury which has been done to the brain, it is also followed by rigors and other symptoms, which indicate its presence: still it would be right in cases in which there



is no fracture, and the other symptoms, rigors, &c. are present, to penetrate the bone, to see whether matter is lodged between it and the dura mater. When an abscess is placed beneath the dura mater, I have never seen a case recover from trephining for it, although that membrane has been opened for its discharge.\*

The operation of trephining used to be of the most complicated kind, requiring several instruments; to learn the names and use of which was of itself a study. It is now simple, and few instruments are necessary. Three will be quite sufficient; viz. a knife with a double edge, in order to separate the pericranium from the bone; an elevator; and a trephine, having a crown; and a pin which will allow of being moved with facility.

*Parts on which the trephine must not be applied.*—There are several parts of the skull on which the trephine should not be applied. First, you should never place it on the median line, which extends from above the nose to the tuberosity of the occiput, on account of the intimate connexion between the dura mater and bone; as well as to avoid the longitudinal sinus on the fore and upper part, and the perpendicular ridge of the occipital bone at the posterior portion. Over the frontal sinuses the trephine could not be used with any effect. There are two other points which it is necessary to avoid: the anterior inferior angle; and the posterior inferior angle of the parietal bone; the first on account of the artery of the dura mater, which penetrates there the parietal bone; and under the second, the lateral sinus is situated. If depression occurs at any of these points, the trephine must be applied at a little distance.

*Elevator to be used alone, if possible.*—Fractured portions of bone may be often raised by the elevator; and I may observe here, that this is the instrument I recommend in cases in which it can be employed without the use of the trephine.

*Hey's saw.*—The saw which Mr. Hey has recommended may be useful in removing an angle of bone, to admit the elevator.

*Mode of performing the operation.*—The mode of trephining is as follows: you are called to a case, in which there is a wound of the scalp, with fracture and depression of the bone; you introduce your finger into the wound, in order to ascertain the extent of the depression. If necessary, you then enlarge the wound, in the direction of the fracture; and if the depression be extensive, you should make a crucial incision, and turn aside the integuments from the part at which you intend to apply the trephine, cut through the pericranium, and separate it from that part of the bone on which the crown of the trephine will act. The pin of the trephine is to be pushed down, and placed on the sound bone, as near to its fractured edge as it can with safety; by this means the portion of bone removed will be in size very little more than that of half of the cir-

\* If the dura mater be punctured, the pia mater should be punctured also, as adhesion will more readily occur.

cle of the instrument. As soon as the teeth of the trephine have entered the bone, and made sufficient way to prevent the instrument from slipping, the pin is to be raised, and the sawing continued. I never saw the pin do any mischief; but my nephew once witnessed an operation in which it perforated the dura mater, the surgeon having forgotten to raise it. When using the saw, let your bearing on it be as equal as possible, and the motion such as the radius will permit, the ulna being fixed: as you proceed in the operation you must frequently introduce a probe into the groove made by the saw, to ascertain how far you have proceeded. In operating on persons of middle age, you may know that you are more than half through by the bleeding which takes place when the diploe is wounded; but in very young or old persons, in whose skulls little or no diploe exists, a few turns of the saw are sufficient to penetrate both tables of the cranium. When you have sawn through at one part, introduce the elevator, separate the remaining part, and raise the bone, which may be easily accomplished, and will prevent the danger of wounding the dura mater.

*Danger of the operation.*—Some surgeons say, that this is a trifling operation, and not difficult to perform: but they would deceive you; it is one of the most dangerous operations in surgery: whilst performing it, there is but a thin web between the instrument and the brain; cut through this and destruction of life will generally be the consequence. Mr. Hunter thought that when the dura mater was wounded the person scarcely ever recovered; which opinion, though not exactly borne out by the cases which have since occurred, show the impression made on the mind of a man who was so great an observer of nature. It is certain, that there is less danger when the dura mater and pia mater are both wounded, than where the dura mater alone is injured. I will tell you the reason: in the former case, where both the dura mater and pia mater are wounded, the brain immediately projects and fills the wound. If I were to pass quicksilver through an opening in the dura mater, where would it go? into the lower part of the spine, between the tunica arachnoides and the dura mater; inflammation of the dura mater spreads over the whole cavity, as erysipelas does over the surface of the body; whereas, in the first kind of injury, fungus granulations will project through the opening, which would easily close by the process of adhesion. I have seen many instances where the dura mater and pia mater have been wounded, and the patients recover, but few where the dura mater has been wounded alone.

*Treatment after the operation.*—After trephining, the elevator should be introduced to raise the depressed bone, and thus return it to its natural situation. You see there is no necessity to operate where there is any additional risk, because an operation in a part where there is no such risk, can be as well performed, and the elevator be introduced under the depressed bone. The scalp is to be returned over the opening, and a poultice should be applied, which.

I believe, is the application most congenial with the feelings, and most conducive to the safety of the patient.

If there be a necessity for taking away more than one portion of bone, the same plan is to be pursued in each operation.

#### OF WOUNDS ON THE SCALP.

*Dangerous.*—Wounds of the scalp are not devoid of danger; and I have known several instances in which apparently slight injuries of that part have destroyed life. Incised wounds are certainly less liable to produce deleterious effects than the lacerated or contused; although I knew a lady, of high consequence in the country, die from the removal of an encysted tumour in the scalp.

*Cause of danger.*—The cause of the danger attending such wounds is the free communication by blood-vessels between the scalp and dura mater; as the vessels of the pericranium freely anastomose with those of the dura mater through the diploe of the skull, and, therefore, inflammation lighted up in the one, is readily extending its influence to the other. There cannot be, therefore, a more absurd and injudicious practice than that of wantonly making incisions through the scalp, to ascertain the exact extent of the injury which the bone may have received, when there are no symptoms to justify such a procedure; because such incisions produce new dangers to the patient, as well as add to that which the injury would itself produce. If, therefore, I am called to a case of injury of the head, in which there is apparent depression of the skull, yet there are no symptoms of injury of the brain, I would not render that fracture compound by making an incision through the scalp; and even if there were symptoms of injury of the brain, I would try the effect of free depletion, before I made an incision, as the loss of blood sometimes occasions the entire removal of the symptoms; but if there were already a wound in the scalp, and my finger passed down to a depressed portion of bone, I would immediately use an elevator to raise it, which may be generally done in children without difficulty, and in the adult would saw off a portion of bone to admit the elevator.

*Mode in which they destroy life.*—The modes in which wounds of the scalp prove destructive to life are threefold: first, by producing what is called, an erysipelatous inflammation on the head; secondly, by producing extensive suppuration under the tendon of the occipito frontalis; thirdly, by rendering a simple fracture compound, they produce a more extended inflammation of the dura mater. With respect to the first of these, the following case of it is frequent. A man comes to the Hospital, and shows a wound of the scalp, which he has received, perhaps, in some drunken affray; a slight dressing is applied to the wound, and the case is considered as too slight for admission; in a few days the man returns with the scalp excessively tumid, and of a florid red colour, and he requests admission; his face soon becomes swollen, his eyes are



closed by the tumefaction of his eyelids, and he has a high degree of constitutional irritation: in a day or two I have seen him in a low muttering delirium; he then becomes comatose, and dies with symptoms of compressed brain. Several of these cases have been examined, one more particularly by my former apprentice, Mr. Callaway, who found that there was great effusion in the scalp, between the occipito frontalis and pericranium, and also between the tunica arachnoides and pia mater. Although this inflammation is said to be erysipelas, and is treated as that disease by giving bark, and other tonics, yet I believe both its cause and its treatment are mistaken; as far as I am able to judge, it is the result of tendinous inflammation of the occipito frontalis, extending from thence to the skin of the head and neck, and that its treatment should be rather evacuant than repleting, as the danger results from the extension of inflammation to the membranes of the brain.

The second mode in which wounds of the scalp produce deleterious effects, is by exciting suppuration under the tendon of the occipito frontalis: such abscesses should be opened early, to prevent the matter extending over a large surface of the skull.

The third mode in which wounds of the scalp prove destructive, is by incisions being made to trace fractures of the skull, producing in this way great aggravation of the inflammation, and extending its influence to the membranes of the brain. An incision in the scalp should, therefore, be never made but in cases of imperious necessity.



THE  
**LECTURES**  
OF  
SIR ASTLEY COOPER, BART. F. R. S.  
SURGEON TO THE KING, &c. &c.  
ON THE  
PRINCIPLES AND PRACTICE  
OF  
**SURGERY,**  
WITH  
ADDITIONAL NOTES AND CASES.

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By **FREDERICK TYRRELL, Esq.**  
SURGEON TO ST. THOMAS'S HOSPITAL, AND TO THE LONDON  
OPHTHALMIC INFIRMARY.

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VOL. II.

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1826.





## PREFACE.

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THE delay in the publication of this volume has been occasioned by a fire at the Printer's, which destroyed the impression when it was nearly completed.

I have added a Paper by Sir Astley Cooper, on the development of the Nipple, which he had the kindness to send me with the following Note:

“DEAR SIR,

“I have looked over this Volume, and find it contains a correct account of the subjects treated of in my Lectures.

“I have sent you a few observations on the swellings which form in the Nipple, and upon the structure in which they are founded; this may form an Appendix to the diseases of the breast which are described in this volume.

“Yours very truly,

“ASTLEY COOPER.

“*Spring Gardens.*”

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&c.

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## LECTURE XIII.

### ON INJURIES OF THE SPINE.

THE effects which arise from violence done to the spine, are very similar to those which are produced by injuries to the head; for example—concussion—extravasation—fracture—fracture with depression—suppuration and ulceration.

#### OF CONCUSSION OF THE SPINAL MARROW.

*Effects of.*—When a person receives a severe blow upon the spine, or, from any great violence, has it suddenly bent, a paralysis of the parts below will frequently succeed, in a degree proportioned to the severity of the injury; and after such an event, the person sometimes gradually recovers the motion and sensation of the paralysed parts.

*Treatment.*—If the part be tender to the touch, or the patient complains of pain, blood should be taken away, near to the part injured, by cupping or leeches, and the bowels should be kept freely open. After a week or ten days, if the patient be not much relieved, a blister should be applied, and the surface be afterwards dressed with equal parts of the unguent: lyttæ and cerat: sabinæ. The extremities should be frequently rubbed with a liniment of a slightly stimulating nature; and as sensation returns, electricity or galvanism may be beneficially employed.

*Case.*—A man was admitted into Guy's Hospital (under the care of Dr. Curry) who had received a severe blow from a piece of wood falling upon his loins. When he was brought into the Hospital, his lower extremities were in a great degree deprived of motion, and their sensation was much diminished. When resting on his back in bed, he could with much difficulty draw up his legs, but could not bend them at a right angle with his body; and a considerable time elapsed before he could make the muscles of his

lower extremities obey the efforts of his will. As there was still the appearance of severe contusion and much deep-seated tenderness at the injured part, blood was repeatedly taken away by cupping, and his bowels were kept freely open by calomel and saline medicines. When the pain and tenderness had been removed, a blister was applied, and a discharge kept up from the surface for three weeks. The liniment: ammoniæ was rubbed on the extremities. In six weeks the motion and sensation of the limbs had nearly returned, when he was submitted to the influence of electricity. By this treatment, in ten weeks, he got perfectly well.

#### OF EXTRAVASATION.

Of effusion of blood into the spinal canal, I have seen but very few examples: one I recollect witnessing in St. Thomas's Hospital. A man had received a severe blow upon the dorsal vertebræ, which produced complete paralysis of the lower extremities, and shortly after his admission into the Hospital he died. Upon examination after death, slight extravasation was found in the spinal canal.

*Case.*—I was consulted about a very interesting case which was under the care of Mr. Heaviside; the particulars of which were as follow: a young gentleman was swinging, when some of his companions caught him by the neck with a rope, during the time that the swing was in rapid motion; by which the whole of the cervical portion of the spine was violently strained. As, however, the line slipped immediately off, he thought but little of it. Subsequently to the accident, for some months he was not aware of any pain or inconvenience; but his school-fellows observed that he was less active than usual; instead of filling up his time by play, he would be lying on the school forms, or leaning upon a stile or gate, when in the fields. From this time he continued to decline, both in strength and power. He was brought to London for advice about the middle of May. His complaints were occasional pains in his head, which were more severe and frequent about the back part and the neck, extending down the back. The muscles at the posterior part of the head and neck were stiff, indurated, and very tender to external pressure: he felt pain in moving his head or neck in any direction: added to these symptoms, there was a great deficiency in the voluntary powers of motion, especially in the limbs.

Two setons were placed in the neck, and he took various medicines, without experiencing any benefit. His complaints, especially the paralytic affection of his limbs, got much worse; besides which, he felt an extremely painful sensation of burning in the loins. In a short time this was succeeded by a sense of extreme coldness in the same part. The pulse and heat were natural.

A consultation of Dr. Baillie, Dr. Pemberton, Mr. Heaviside, and myself, was held, and the application of mercury was determined on. The pilul: hydrarg: was taken for a few days; but as it produced violent action upon the bowels, mercurial frictions

were consequently employed. He felt his limbs getting every day weaker, but his neck was more free from pain when moved, and he was more capable of moving it by his own natural efforts.

On the 7th of June his respiration became laborious; all his symptoms rapidly increased, and on the following day he expired.

#### EXAMINATION.

The whole contents of his head were carefully examined; and appeared perfectly healthy; but upon sawing out the posterior parts of the cervical vertebræ, the theca vertebralis was found overflowed with blood, which had been effused between the theca and the enclosing canal of bone. The dissection being further prosecuted, this effusion was found to extend from the first vertebra of the neck to the second vertebra of the loins, both included.

The preparation, which is in the museum of Mr. Heaviside, only shows a small portion of the effused blood, which had become coagulated on the theca; as much of it, being fluid, escaped during the examination.

#### FRACTURE WITH DISPLACEMENT.

The separation of one vertebra from another is of very rare occurrence without fracture; and the supposed dislocations of the spine are, in a very large majority of cases, fractures with displacement. When this happens, the parts of the body situated below the seat of injury become paralyzed. Thus, if it occur in the lumbar vertebræ, the person immediately loses all power of motion and sensation in his lower extremities, his faces pass off involuntarily, the action of the sphincter ani being destroyed; and his urine is retained, the bladder being unable to contract.

*Of the dorsal.*—When the dorsal vertebræ are the seat of this injury, all those parts situated below the fracture are paralyzed, as in the former case; but in addition, the abdomen becomes distended with air, which escapes into the intestines in consequence of the diminished powers of the part; this gradually subsides after the patient's bowels have been freely opened.

*Of the lower cervical.*—If the fracture with displacement takes place in any of the cervical vertebræ below the fourth, the same symptoms occur in the body and lower extremities as when the dorsal vertebræ are injured; and there is also a partial paralysis of the upper extremities, but seldom such as to deprive the patient of all motion and sensation.

*Of the upper cervical.*—When it happens above the fourth cervical vertebra, the person generally dies on the instant; because the diaphragm is paralyzed, which is the only agent in supporting respiration after such injury of the lower vertebræ of the neck; but when the fracture with displacement is above the origin of the



phrenic nerve, the diaphragm loses its power, and dissolution almost immediately results.

*Period of termination.*—Patients rarely recover from these injuries to any part of the spine, but the period at which life is destroyed varies according to the seat and violence of the accident.

*From injury to the lumbar vertebræ.*—In the loins, if the displacement be considerable, the person may die in three weeks; but if slight, the patient may survive many weeks. I recollect a case in which the patient lived two years after a supposed fracture with displacement of the lumbar vertebræ; but the precise nature of the injury was uncertain, as the friends would not permit any examination of the body after death, by which alone the extent of the mischief could have been decidedly ascertained.

*To the dorsal.*—The patient usually survives a much shorter period when the dorsal vertebræ are injured: although I have known a gentleman live nine months after such an accident to this part, which was occasioned by his horse falling, and rolling upon him, after leaping over a wide and deep road, to which he came unawares whilst riding at speed.

*To the lower cervical.*—After the occurrence of such injury between the fourth and seventh cervical vertebræ, the patient seldom lives longer than four or five days, and in some cases dies within eight-and-forty hours after the accident.

*Fracture without displacement.*—Fracture of a vertebræ may take place without displacement; a curious instance of which occurred in the cervical vertebræ, at the time I lived with Mr. Cline, the particulars of which were as follow:

*Case.*—A girl received a severe blow upon her neck; after which it was observed that whenever she wanted to look at any object, either above or below her, she always supported her head with her hands, and then gradually and carefully elevated or depressed it, according as she wished, towards the object. After any sudden shock she used to run to a table, and placing her hands under her chin, rested them against the table until the agitation occasioned by the concussion had subsided. Twelve months after the accident the child died; and on examination after death Mr. Cline found a transverse fracture of the atlas, but no displacement. When the head was depressed or elevated, the dentiform process of the second vertebra became displaced, carrying with it a portion of the atlas, occasioning pressure upon the spinal marrow, which was also produced by any violent agitation.

*Treatment.*—In the treatment of fractures of the spine, with displacement, no plan, hitherto adopted, has been productive of any permanent benefit.

*Mr. Cline's operation.*—Mr. Henry Cline, who was an excellent anatomist, and a very good surgeon, first attempted to afford relief by operation after this accident, as he thought that cases of this kind should be treated as those of fracture with depression of the skull; and he had made numerous experiments, the result of which gave

him reason to suppose that such an operation might be successful. He cut down upon the spine, at the part where the displacement was evident, and having exposed the spinous process and arch of the injured vertebra, he sawed through the arch near to the transverse process with a small trephine of his own invention, and then raising the depressed portion of bone, he thus took off the pressure from the spinal marrow.

It is well known that union of bone has taken place after fracture with slight displacement of the vertebræ. Mr. Brooks has a preparation showing a union of this kind; and in the museum at the College of Surgeons is another portion of spine, presented by Mr. Harold, of Cheshunt, in which union has been produced after an accident of this nature. There can be no fear then as to the restoration of the part, if the pressure on the spinal marrow could be removed.

In many cases of fracture with displacement of the spine, the spinal marrow is either partially or completely torn through. In such instances little good could result from an operation; but in others the spinal marrow is apparently but little injured; and in such cases it was, that Mr. Cline thought there might be hope from an operation. Mr. Tyrrell has performed the operation since Mr. Cline, but both cases terminated fatally:—whether future trials

\* As this case has been published in a foreign work, with some inaccuracies, I take this opportunity of giving a correct detail of it.

John Buckley, aged twenty-five, a labouring man, about the middle size, and of rather spare habit, was brought into St. Thomas's Hospital, on the evening of Tuesday, the 15th of October, 1822, having received some injury to the spine, which was occasioned by his slipping at the time he was carrying a heavy load of cast metal: he fell about five feet, but was not aware that the metal struck him. The accident had happened early in the morning of the 13th, since which time his urine and fæces had passed off involuntarily. I saw him a few hours after his admission into the Hospital, and, on examination, found that he had lost all sensation and power of motion, below Poupart's ligament anteriorly, and the lumbar vertebræ posteriorly; in fact, the superior edge of the pelvis marked accurately the line between the sensitive and the non-sensitive parts. The spinous process of the twelfth dorsal vertebra was depressed, and he complained of acute pain when this part was touched. The temperature of all parts was equal. He had not passed any urine since his admission, but at night he complained of its accumulation giving him inconvenience, when it was drawn off 16th. He was much the same in every respect; in the afternoon, my colleague (Mr. Green) was kind enough to see him with me; when he decided that an operation, similar to that performed by Mr. H. Cline, might probably be beneficial; but as our consultation was late in the day, and the operation likely to be very tedious, I deferred it until the next morning. 17th. No improvement or abatement of any of the symptoms: at half past ten o'clock he was taken into the operating theatre on his bed, being placed with his face downwards, and some pillows under the lower part of the abdomen, in order to elevate that portion of the spinal column which had been injured. My colleagues (Messrs. Travers and Green) being present, I performed the following operation. An incision, about six inches in length, was made through the integuments, in the direction of the spinous processes, having that of the last dorsal vertebra in the middle, over the point of which was observed some slight extravasation of blood. The muscles were then se-

will be more successful, it is difficult to say; we cannot speak decidedly on the subject, as the first operations have been unsuccessful.

parated by the scalpel, from the sides of the spinous processes, and from the arches of the twelfth dorsal and first lumbar vertebrae, as far as the transverse processes, also partially from those above and below. During this separation some arterial hemorrhage occurred, which was very troublesome in obstructing my view of the parts; but it was not very copious. An assistant then held aside the integuments and muscles with a broad bent piece of iron, so as to allow of the application of a small trephine on the arch of the first lumbar vertebra. After using the trephine for some time ineffectually, I cut away the spinous process of the vertebra with a chain saw, which enabled me to see much better the operation of the trephine; and finding that I made very little progress with it, I took, instead of it, one of Hey's small saws, with which I sawed nearly through the arch, close to the transverse process; and after having done the same on the other side, I soon succeeded in removing the larger part of the arch with a pair of strong tooth forceps, leaving but a thin portion, covering the canal. The arch of the twelfth dorsal (over which the extravasation had been observed) was distinctly found to be loose: I then proceeded to remove it, as I had done the former, which I soon effected completely, so as to expose the ligamentum subflavum: this was found divided: on elevating it, the dura mater covering of the cord was seen quite perfect, and apparently free from injury. I then removed the portion of the arch of the first lumbar, which I mentioned as having left, together with the ligament, exposing near two inches of the sheath of the cord, which appeared healthy; and under which the pulsations of the cord could be seen. The patient could now feel distinctly, on being pinched inside the thigh; which immediate return of sensation was beyond my most sanguine expectations. The edges of the wound were brought together by two sutures, dressed lightly with strips of adhesive plaster, and the patient removed to his ward, on the same bed, and in the same position.

I am much indebted to my colleague, Mr. Green, for his assistance, and am happy in having this opportunity of publicly thanking him for his kindness, not only in this instance, but many others in which I have had occasion to ask his advice or assistance. The operation occupied nearly an hour and an half, during which time the patient scarcely uttered a complaint. More patience is required in the performance of this operation than skill; as it is extremely tedious, and requires much care in using the saw; also in elevating the bone from the canal. The trephine is of no use; the scalpel, Hey's saw, and the forceps, are all the instruments required, with the piece of bent iron to hold aside the muscles. Mr. H. Cline used this last instrument, which answers the purpose much better than the fingers of an assistant could do, and is much less in the way.

Soon after being placed in his ward, he took thirty drops of the tincture of opium, as he expressed a wish for something to make him sleep. I saw him again at three o'clock, when he said he felt very comfortable; but did not appear to have more sensation than when removed to his ward after the operation; he had not slept, in consequence of which the tincture of opium was to be repeated in the evening. Being engaged out of town, I did not see him again until about one o'clock in the morning of the 18th: he was perfectly easy; had slept, and felt me pinch his toes: a very considerable oozing had taken place from the wound, more of a serous than sanguineous nature; his pulse was feeble; in consequence of which I directed him to take weak wine and water, when thirsty. Ten o'clock. Had slept comfortably since I quitted him; serous discharge still continues from the wound, which looks healthy: the edges in several parts adhering; pulse still weak; ordered his wine and water to be made stronger. One o'clock. Complained of his bladder being distended, when I introduced a flexible catheter, and drew off about a quart



ful. The proposal is laudable, and the operation is not severe, nor does it increase the danger of the patient; time and experiment can

of high-coloured urine. The catheter was allowed to remain in the urethra, and I desired that the bladder might be kept empty, by frequently taking out the plug and letting the urine flow off. Eight o'clock. Very easy; had passed but little urine since; pulse had got up considerably, but was soft and regular. Not having passed any feces since the operation, I ordered an injection of common salt and barley water (the enema com: of the Hospital) to be thrown up; he felt it pass, and it was retained: wine and water to be weakened. 19th. Ten o'clock. Had slept well; pulse good; wound looking very healthy; slight suppuration; sensation more general and distinct; had not had any motion or return of the injection, in consequence of which I directed him to take four grains of calomel and a scruple of rhubarb immediately. His position (which had not been altered since the operation) being uneasy, I had him turned a little to one side, propping him well with pillows. His urine had been frequently allowed to flow off; but much had not passed. Eight o'clock. Very comfortable; pulse rather full; to omit his wine. 20th. Slept well; pulse good; sensation more distinct; wound looking well, with rather more suppuration; his position changed to the other side; has not had any motion; enema to be repeated, with the addition of an ounce of castor oil. 21st. Bowels freely open, but the passage of the feces involuntary, although he could tell when they passed. He had not slept quite so well, on account of the nurse having loaded him with bed clothes, which occasioned very copious perspiration: pulse good; wound healthy: sensation improving: during the night, a considerable quantity of urine escaped into the bed, in consequence of the nurse having taken the plug from the catheter; it was extremely ammoniacal, and caused excoriation in two or three places about the thighs; a dry sheet was drawn under him, and powdered chalk applied to the excoriations. 22d. Slept well, but again perspired profusely; pulse weak; wound healthy; rather more excoriation: to take some diluted nitric acid, and to eat a small quantity of meat; position occasionally changed from side to side; sensation gradually increasing. 23d. Slept tolerably, perspired but very little, was rather restless; pulse good; wound healthy; the urine loaded with mucus; in consequence of which I directed that he should omit the acid, and take some liquor potassæ, with a few drops of tincture of opium, three or four times in the day. Hitherto he had been lying on his abdomen, and now and then turned a little to either side; this position was very uncomfortable to him, and the pressure on the excoriated parts very painful; I therefore ordered a clean bed to be made up, with the addition of two long soft pillows, which were placed lengthways on the bed, under the sheet, leaving a space between them; he was then carefully moved into it, and placed on his back, with the spine in the space between the pillows: he expressed much relief from this alteration, which did not occasion the slightest inconvenience. 24th. Slept well, and had turned a little to the side in the night; wound healthy; pulse good; discharge of mucus with the urine less in quantity. The catheter had been withdrawn the evening before; and, during the night, he had passed small quantities of urine of his own accord; but there is still a dribbling; he also feels distinctly the passage of the feces, but cannot retain them. The liquor potassæ had been given him in the night, undiluted; by which his mouth was burnt, and he objected to take any more. I, therefore, ordered a mixture of carbonate of soda, carbonate of magnesia, and mucilage, to be taken two or three times a day instead. Sensation pretty distinct to the toes. 25th. Had not slept very well; pulse good; and wound healthy; quantity of mucus in the urine larger: to take soda water. At eleven o'clock in the evening I was sent for, in consequence of his complaining of pain in the region of the bladder. His countenance was rather anxious, and he was very restless; the pain was confined to the region of the bladder; the abdomen

only determine its value. If we could save one life in a hundred by it, we should deserve well of mankind; and if any good does

flaccid; and the bowels freely open. The catheter had been passed, by which a considerable quantity of mucus was drawn off—this had relieved him a good deal; pulse not in the least hard or thready; to foment the lower part of the abdomen, and to take thirty drops of opium every four hours; some mucilage, alkali, and opium, to be injected into the bladder. 26th. Had slept at intervals; pulse pretty good; wound healthy; urine not so much loaded with mucus; still considerable pain at the lower part of the abdomen. Leeches to be applied immediately; the fomentation continued, and opium to be taken every four hours. 27th. Had been relieved by the application of the leeches, which I ordered to be repeated, as he still complained of pain. Slept a little; much anxiety of countenance: urine still loaded with mucus, and tinged with blood; pulse rather quick, but soft. The fomentation to be continued; bowels freely open; the pain in the region of the bladder increased a little in the evening, when I again ordered the leeches, and constant fomentation. 28th. Appeared much better; had slept well, and had very little pain in the abdomen, which was considerably distended, but not tense, or painful on being pressed; wound looking healthy; pulse much the same as yesterday: urine not so much loaded with mucus, but still tinged with blood; much troubled with flatulence; in the evening he was much the same. 29th. Had slept tolerably for a few hours after I saw him; but early in the morning awoke with pain in the stomach, and immediately began to vomit; the vomiting continued almost incessantly until I arrived at the Hospital in the morning, when it abated a little; but he still continued at intervals to throw up quantities of a dark green bilious-looking fluid, the same as he had ejected from the first; it was not frothy, nor had it a fetid or sour smell: I ordered him to take the effervescent mixture, (subcarb. of potash, mint water, and lemon juice,) with ten drops of tincture of opium, every half hour, and waited to see the effect: after taking two doses, he became much more tranquil, and went to sleep, in which state I left him. The vomiting returned occasionally during the day, but was always relieved by the effervescent mixture. In the night he was very restless; and on one occasion, when the nurse quitted his bedside for a few moments, he nearly got out of bed, and was only prevented by her return; towards morning he became more quiet, but was evidently sinking, and he died about six o'clock on the 30th, having been perfectly sensible until within a short time of his death.

The attempt to get out of bed is mentioned by Mr. Charles Bell as a common circumstance in the termination of fatal cases of injury to the spine, therefore cannot be regarded as any proof of recovery of motion from the operation.

#### DISSECTION.

I inspected the body between three and four o'clock the same day, and the following is an account of the appearances:

On opening the cavity of the abdomen a quantity of air escaped, which had little smell; the peritoneal covering of the parietes adhered slightly to the ilium and cæcum on the right side of the pelvis, but was otherwise quite healthy; a small quantity of dark-coloured fluid in the cavity of the pelvis. The liver, pancreas, and spleen quite healthy. The stomach, viewed externally, appeared sound; but on opening it, the vessels of its mucous surface were found much injected with red particles, which I considered the effect of long-continued vomiting, not of inflammation. The folds of the small intestines immediately in contact with the bladder, and on the right side of the pelvis, near the cæcum, adhered together, but, more particularly near the bladder; on removing them, the bladder was exposed, much thickened, and of a bluish tint: I passed a catheter, with a view of keeping it from the pubis,

ultimately result from it, Mr. Henry Cline has the merit of proposing it.—*Palmam qui meruit ferat.*

that I might remove it more easily; but with a little pressure, the end of the instrument broke through its parietes; when removed, the whole of its coats were found to be in a morbid state, but more particularly the mucous one, which was much thickened, and its internal surface very rough: much as I have seen it in patients who have suffered a length of time from irregular stone in the bladder: it was altogether pulpy, and easily broken down. The alteration of structure extended to the membranous part of the urethra. The kidneys and ureters were perfectly healthy; nor was there any other diseased appearance either in the abdominal or thoracic viscera. The fracture of the body of the vertebra was not discovered, until the vessels, &c. covering it, had been removed. The surface of the wound made in the operation was sloughy, but this did not extend deeper than the newly-formed matter. There was a deposition of lymph externally on that portion of the dura matral covering, which had been exposed in the operation, as may be seen by the preparation of the parts, which are preserved in the collection of St. Thomas's Hospital; but both it and the spinal cord itself were otherwise apparently in a sound and healthy state.

#### REMARKS.

All attempts which have as yet been made to relieve patients suffering from injury to the spinal column, by operation, have proved unsuccessful; but, I think, under such circumstances, that, instead of deterring others from undertaking similar operations, they rather tend to encourage them in the performance.

When the above case occurred, I was not aware that any one, excepting Mr. Henry Cline, had performed this operation; but I have lately received some account of a case in which Mr. W. Wickham, junior, of Winchester, operated about six years ago; and I understand that Mr. Attenburrow, of Nottingham, has also performed an operation of a similar nature; but I have not been able to procure any particulars of the case.

The patient upon whom Mr. Wickham operated, had received a severe blow upon the back and lower part of the neck, causing fracture with displacement of the seventh cervical vertebra. The body and the inferior extremities were completely paralyzed, and there was also partial affection of the superior extremities. Mr. Wickham did not see the patient until several days after the accident; and had not therefore an opportunity of performing the operation sooner than the eighth day subsequent to its occurrence, at which period he did it more from the earnest solicitations of the patient and his friends, than from any conviction of its being likely to prove beneficial.

The operation was easily performed, and the patient was in a degree relieved by it; his breathing became more free, and sensation returned to a considerable extent, but he died on the second day after the operation.

Mr. Wickham (to whom I feel much indebted for these particulars) informs me, that the benefit afforded by the operation, even at the late period at which it was performed in this case, was such as to induce him to think much more favourably of the probable result of a similar operation, performed at an earlier period after the injury, than he did before the occurrence of the above case.

The friends of the patient would not permit Mr. Wickham to examine the injured parts after death, so that he was not able to ascertain the precise extent of mischief.

In Mr. Henry Cline's case the spinal marrow and its membranes had been completely torn through, so that a favourable termination could not be expected.



## OF SUPPURATION AND ULCERATION OF THE SPINAL MARROW.

The only case in which I have had an opportunity of ascertaining this disease by dissection, was the following :

*Case.*—A gentleman who resided about eight miles from London, had, by a fall, received a severe blow on his spine, which did not, however, produce any immediate ill effect. Some time after, having been much exposed to changes of weather, he was suddenly seized with pain in his back, which was followed by paraplegia, retention of urine, and involuntary discharge of fæces. I was requested to see him on account of the retention of urine, and attended him for a length of time for the purpose of using the catheter. For several weeks his symptoms remained unchanged, excepting the appearance of a troublesome sore on the nates. Towards the close of his existence, he complained of much uneasiness and distention at the upper part of his abdomen. His appetite failed, he rejected his food, and he had a great deal of fever, with quick pulse and profuse perspiration—he sunk gradually.

## DISSECTION.

Upon opening the spinal sheath, a milky fluid was found within it, just above the cauda equina ; and higher up, about three inches, the spinal marrow was ulcerated to a considerable depth, and was in that softened state which the brain assumes when it is rendered semifluid by putrefaction. All the other parts of the body were healthy, excepting the bladder, which was considerably inflamed.

My patient died of inflammation of his bladder, occasioned by the irritation of the urine, which, I believe, might have been prevented ; and I should have taken steps for that purpose had I then known some circumstances, of which I have since been informed, connected with Mr. Cline's experiments relative to injuries of the spine. He invariably found, that when complete paraplegia was produced by the injury which he inflicted on the spinal marrow of dogs, that the bladder became affected from the action of the urine on its mucous coat. This organ having lost its nervous power, it appears that the urine becomes decomposed in it, as it does after it is voided in the usual manner, and it then acts as an irritant on the mucous surface ; this might probably be obviated by frequently emptying the bladder by means of a syringe, and by injecting a mucilaginous fluid to protect the mucous coat.

The immediate, although partial, return of sensation in my patient, and the after gradual increase of feeling, are proofs that the operation was in a degree serviceable. The patient also lived long enough to show that the effects of the operation upon the parts immediately concerned in it, are not sufficient to afford any ground for objection to its performance.

Every surgeon knows what the termination of these cases without operation always is ; therefore why not attempt to save the patient by an operation, easy in its performance, and not in itself productive of any serious mischief.—T.

## TREATMENT.

In a case like this, it will be required to take precautions to prevent inflammation, by cupping or leeches: subsequently, counter-irritation, by blisters or tartar emetic, will be useful: issues or setons may also, in some cases, prove beneficial.

## LECTURE XIV.

## ON ANEURISM.

*Definition.*—An aneurism is a pulsating tumour communicating with the interior of the heart, or of an artery, and containing blood.

*External and internal.*—When an aneurism is seated in one of the extremities, or upon any superficial artery, it is generally called external; when situated upon any of the arteries of the cavities, as the abdomen or thorax, it is termed internal. In the first case, there is usually but little difficulty in ascertaining the nature of the disease; in the latter case, however, much obscurity often exists, rendering the diagnosis extremely doubtful.

*Three stages of external Aneurism.*—In the formation of external aneurisms, three stages may be observed. At first, a small tumour is perceived, which pulsates very strongly; it then contains only fluid blood, and may be easily emptied by pressing upon the artery which supplies it, between the swelling and the heart, thus stopping the flow of blood into the sac. When in this stage, the patient does not experience much pain or inconvenience; sometimes he is attacked with cramp or spasmodic contractions of the muscles of the limb below the aneurism, more particularly when undressing to go to bed.

In the second stage, the tumour is larger and more solid, and the sac cannot be completely emptied as in the former case. The blood has in part coagulated in the interior of the sac, and its parietes have become much thickened. The size of the swelling, and its pressure on the surrounding parts, now creates pain, and retards the circulation. The pulsation is still distinct, but not so violent as in the first stage.

In the third stage, the size of the aneurism is still further augmented, and it acquires much more solidity. The pulsation is very indistinct, and only to be felt at that part of the tumour which is opposite to the orifice in the artery. The sac is now almost filled by layers of fibrous matter, and contains but a very small quantity of fluid blood. The patient experiences much severe pain, and great inconvenience in moving the limb, particularly if the aneu-

rism be seated near a joint ; the extreme parts of the limb become œdematous, from the pressure of the tumour impeding the functions of the veins and absorbent vessels ; sensation is also diminished from pressure on the nerves.

*Mode in which life is destroyed.*—After this the aneurism continues slowly to increase ; the integument over it becomes of a dark colour ; inflammation of the cutis takes place, and the cuticle is partially separated by the formation of vesicles. A gangrenous spot next appears, and in a short time an eschar is formed and separates, by which the sac is opened ; some blood immediately escapes, but rarely in sufficient quantity to destroy life. The patient sinks from the repeated loss of blood, much more frequently than from one copious hæmorrhage.

At first, the opening into the aneurismal sac is small, and the bleeding which takes place usually slight, being easily stopped by pressure upon the wound ; but as the sloughing process proceeds, the opening becomes enlarged, and the hæmorrhage returns, and thus, by the repeated loss of blood, the life of the patient is destroyed. Sometimes an aneurism commencing internally, but breaking externally, causes death in the same way, as for instance, an aneurism in the thorax ; but when it opens internally, the patient frequently dies instantaneously.

*Sometimes destroy life suddenly.*—I have, however, known the bursting of an external aneurism cause immediate loss of life. A man had an aneurism in the groin, which burst on his making an attempt to throw off his bed clothes and to raise himself in bed, and he died in a few moments.

*Not always destructive.*—An aneurism does not always prove destructive to life, although no operation be performed for its cure. I have seen gangrene of the foot and lower part of the leg produced by a popliteal aneurism ; the gangrenous parts separated, and the patient recovered.

*Internal aneurism.*—I shall now describe internal aneurisms, which differ in some respects from the external.

#### ANEURISM OF THE HEART.

An aneurism of the heart consists of a sac formed externally to the parietes of that organ, but having an opening in it, which communicates with the interior of one of the cavities. It is a very rare disease, and I have only seen three specimens of it ; for the dilatations of the ventricles, which are not uncommon, and which are frequently called aneurisms, are not really so. We have two preparations of this disease in the Museum at St. Thomas's Hospital.

*Case.*—One of the cases, in which I had an opportunity of seeing the disease, was under the care of Mr. Palmer, assistant surgeon in the army. A soldier belonging to the regiment to which Mr. Palmer was attached, received a severe flogging, and during the



punishment he held his breath ; he shortly after this complained of a violent pain in his chest, which was quickly followed by ascites and œdema of his inferior extremities. He died suddenly, and upon inspecting his body after death, Mr. Palmer found, that an aneurism which had been formed on the left ventricle, had burst into the cavity of the pleura on the left side.

*Case.*—Another case occurred under Mr. Postlethwaite, of Chichester. The patient had symptoms of organic disease of his heart, with ascites and œdema, as in the former case. The man died suddenly, and an aneurism of the left auricle was found on examining his body. The aneurism was of the size of a large walnut, and a quantity of blood was effused between the coats of the auricle.

#### ANEURISM OF THE ASCENDING AORTA.

The commencement of the aorta, just where it is covered by the pericardium, is not an uncommon seat of aneurism. We have some preparations in the Museum at St. Thomas's Hospital, showing the disease situated at this part. In one of these specimens the aneurism had burst into the pericardium, which was found filled with blood. The history of the patient from whom this aneurism was taken, may be useful, in order to make you cautious in such cases.

*Case.*—A man who had been admitted into Guy's Hospital under my care, having a popliteal aneurism, was taken into the operating theatre, for the purpose of having a ligature put upon his femoral artery. He was placed upon a table in the proper position, and I had commenced the operation, when he stretched himself on his back, and I perceived his urine flowing from him. This, I said, is something more than common apprehension, or expression of pain ; I took out a lancet, and opened a vein in his arm. but the blood did not flow ; I then tried to bleed him from the jugular vein ; he gave a deep gasp, and in a few minutes was dead. The next day I opened the body in the presence of the pupils, when I found the pericardium distended with blood, which had escaped from an opening in an aneurism seated at the beginning of the aorta, immediately above the semilunar valves. If I had finished the operation, I might have had the credit of killing this patient.

You should be particularly careful not to perform an operation for an aneurism, until you are satisfied that no others exist, as it often happens that many aneurisms form in several parts of the same individual at once. Mr. Cline was about to operate upon a man in St. Thomas's Hospital, who had a popliteal aneurism, but deferred it on account of the patient's complaining of pain in his abdomen. A few days afterwards the man died suddenly, and, on examination, an aneurism was found between the two emulgent arteries, which had burst into the abdomen.

*Aneurism producing absorption of bone, &c.*—Absorption of part

of the sternum and of the cartilages of the ribs, sometimes takes place from the pressure of an aneurismal sac, situated between the heart and curvature of the aorta. We have a preparation in which three of the cartilages of the ribs, and a considerable portion of the sternum have been thus destroyed.

*Progress of this Aneurism.*—An aneurism seated on this part of the aorta, at first usually presses upon the lung, producing oppression in breathing and cough, and is, at this stage, often confounded with dyspnœa arising from other causes: but as the disease increases, the upper part of the chest becomes enlarged, and a pulsation may be distinctly felt by pressing on the intercostal spaces. The cartilages of the ribs are then absorbed, and subsequently a portion of the pectoral muscle; inflammation is produced in the integument; an eschar forms in the centre of that inflammation, and as the eschar gradually separates, the patient loses his life from hæmorrhage.

*Life may be prolonged.*—In these cases the life of the patient may be often prolonged, even after bleeding has commenced, by coating the wound, and forming an artificial sac; and two or three weeks may be thus added to life, and enable the patient to prepare for that “bourn from whence no traveller returns.”

*Case.*—A woman was admitted into Guy’s Hospital, having an aneurism of the ascending aorta. The skin became inflamed, an eschar formed and in part separated, so as to allow of the escape of a quantity of blood; the hæmorrhage stopped in consequence of a coagulum plugging up the orifice, and the wound was more completely closed, by the application of some lint, confined by plasters and bandages: no further bleeding occurred, but the patient died twenty-seven days after the first hæmorrhage, in consequence of inflammation of the aneurismal sac, and of the aorta.

#### ANEURISM OF THE CURVATURE OF THE AORTA.

These aneurisms project just above the sternum, and they destroy life in different modes; sometimes bursting externally, as in the former examples, sometimes occasioning death by their pressure. I have an example, given me by Mr. Davis, formerly surgeon of the Custom House, in which death was produced by its bursting into the trachea. The man was rising from his bed, when he was seized with cough, immediately expectorated blood, and died in a few minutes from suffocation and loss of blood. Upon dissection, an ulcerated opening about the eighth of an inch in diameter was found in the trachea from the aneurismal bag.

*Sometimes resemble carotid aneurism.*—Aneurisms beginning from the curvature of the aorta, sometimes rise to the middle of the neck, and assume the appearance of carotid aneurism. A specimen was given me by Mr. Dyson, surgeon, of Fore Street, who sent to me to say that he had a carotid aneurism under his care, which he wished me to examine. I found a tumour in the side of the neck,

but thought I could trace a small swelling from it to the sternum, and, therefore, refused to operate. The patient lived seven months, and Mr. Dyson gave me the aneurism which sprung from the curvature of the aorta: a large bag was formed in the neck, communicating by a narrow canal with the curvature of the aorta.

*Case.*—Mr. Allan Burns, formerly a most excellent surgeon and anatomist at Glasgow, wrote to me respecting a pulsating tumour above the clavicle, upon which it was proposed to perform the operation for aneurism. In my answer, I said,—Take care that the case which you have described is not an aneurism of the aorta. The operation was not performed; the patient died of the disease, which proved, upon dissection, to be an aneurism of the aorta. This case is mentioned in Mr. Burn's excellent work on the anatomy of the neck.

*Produce suffocation.*—Aneurisms of the curvature of the aorta sometimes destroy, by their pressure on the trachea producing suffocation; sometimes they occasion great difficulty in swallowing, by their pressure on the œsophagus; and when seated at the lower part of the curvature, they now and then appear at the back between the scapulæ.

#### ANEURISM OF THE ARTERIA INNOMINATA.

This case will rarely allow of an operation. Here is a specimen of it, and you will see that there is scarcely any space between the aneurism and the aorta; and I think it one of the most difficult operations in surgery. My friend, Dr. Mott, of New York, is the only person who has had the intrepidity to put a ligature on this vessel: the patient, for a time, appeared to be doing well, but ultimately did not recover.

#### ANEURISM OF THE DESCENDING AORTA WITHIN THE THORAX.

On the aorta in the posterior mediastinum, I have seen three small aneurisms. When they become large, they sometimes burst into the œsophagus. I have an excellent preparation given me by Mr. Armiger, in which you may see a large aneurismal bag with an ulcerated opening into the œsophagus. The patient died from profuse vomiting of blood. In the morbid collection at Guy's Hospital, you may see a similar specimen taken from a patient of Mr. Foster's, who not only vomited blood, but passed a considerable quantity by stool.

#### ANEURISM OF THE ABDOMINAL AORTA.

When an aneurism is seated above the cæliac artery its pulsation may be distinctly felt at the scrobiculus cordis: and the pressure of the swelling on the upper curvature of the stomach produces so frequent an inclination to vomit, that the patient is under



the necessity of observing extreme abstinence, to keep the stomach in a quiescent state.

*Bursting into an intestine.*—When the aneurism is seated lower down, and on the fore part of the aorta, it sometimes bursts into an intestine. Dr. Scudamore brought a gentleman to my house, who had a pulsating tumour just above the umbilicus. A few weeks afterwards I was sent for to this gentleman at Henley, who had been seized with fainting, and a discharge of blood by stool: he revived a little, but on the following morning the discharge of blood returned, and he died suddenly: in the aneurism which I removed from him, you may see that the jejunum had adhered to the fore part of the aneurismal bag, and that the sac had ulcerated into the intestine.

*Producing absorption of the vertebræ.*—When the aneurism arises from the posterior part of the aorta in the abdomen, it presses upon the spine, and produces absorption of the vertebra: it then proceeds until it appears between the last rib and spine of the ilium in the loins. In a specimen taken from a patient in the other Hospital, by Mr. Howden, the aneurism projected into each loin. As the aneurism, when it appears in the loins, and has acquired any magnitude, does not in general pulsate, you must be upon your guard that you do not mistake it for lumbar abscess, a circumstance I once saw happen. A surgeon, in a hasty way, said, “This is a lumbar abscess,” and plunged a lancet into it, and then with something of a similar exclamation, he said, “God bless me! this is blood;” a piece of adhesive plaster was applied, covered by a roller, and the wound healed, and the patient afterwards died of the bursting of the aneurism internally.

*Appearing at the ischiatic notch.*—I have seen an aneurism seated in the cavity of the pelvis pass through the ischiatic notch under the gluteus maximus muscle, where it produced a large pulsating tumour, which I at first thought was an aneurism of the gluteal artery; but feeling apprehensive that it might have some communication with the vessels of the interior of the pelvis, I would not operate; and the patient, before he died, had an hæmorrhage from his bladder, which showed that the aneurism was seated within the pelvis, and that it had protruded into the ischiatic notch.

#### OF THE SIZE OF ANEURISMS.

The aneurism given me by Mr. Howden is the largest I have ever seen: it began from the posterior part of the aorta by the emulgent arteries; on the one side it passed into the loins, and it there contained many pounds of blood; on the other side it first projected into the loin in the situation of the left kidney; it then descended over the psoas muscle under the sigmoid flexion of the colon, and terminated on the brim of the pelvis.

## OF THE NUMBER OF ANEURISMS IN THE SAME INDIVIDUAL.

The greatest number of aneurisms which I have seen in the same person is seven : an Irish labourer came into the other Hospital, with an aneurism at the origin of the arteria profunda, and another in the femoral artery, near the middle of the thigh. I tied the external iliac artery above Poupart's ligament, and the man, some time afterwards, died of an aneurism at the bifurcation of the aorta, which burst into the cavity of the abdomen : I injected the limb, in which you have an opportunity of seeing beautifully the anastomosis of the iliac artery, with the vessels of the thigh. Upon examination of this man's body, an aneurism was found in each ham ; one at the bifurcation of the aorta, one at the origin of the arteria profundæ, one in the middle of the thigh, and two between the popliteal aneurism and the femoral, making in all seven aneurisms.\*

\* The following case is curious, perhaps, on account of the number of aneurisms which existed in the same person ; but I have introduced it because, having received a useful lesson from it myself, I think the history of it may be of service to others.

W. Wardle, æt 47, was admitted into St. Thomas's Hospital, on the 29th of May, 1825, on account of a large swelling, which occupied the left ham, and extended on to the fore part of the thigh, just above the knee, projecting chiefly on the inner side over the vastus internus muscle. The integument was florid, and he had rigors, with other symptoms of suppuration. On attentively examining the swelling, I found an evident sense of fluctuation, and pressing my hand firmly on it, I could feel a thrill, which was also felt by several gentlemen who were with me at the time. His own history of the disease was very unsatisfactory, and certainly rather indicated the formation of an abscess than of an aneurism. There being considerable doubt about the precise nature of the swelling, on the following morning I requested Mr. Green and Mr. Key to see the patient with me : in examining the part, neither of them could feel the thrill I before mentioned ; and, on consultation, we determined that a small puncture should be made ; as little harm could result from it, even if it proved to be an aneurism. I therefore carefully introduced a lancet near the boundary of the tumour, on the upper part over the rectus muscle, when a jet of arterial blood at once convinced us of the true nature of the disease. The opening was immediately closed by the pressure of the finger on it, and the patient was conveyed into the operating theatre, that a ligature might be placed on the femoral artery. Whilst feeling in the course of the artery, before commencing the operation, I found a small aneurism near the part in which I had intended to secure the vessel ; this led to a more minute examination of the patient, and at that period another aneurism was found, just above the tendon of the triceps, on the same side, making two femoral aneurisms and a popliteal on the left side. On the right side the artery felt dilated in several places, but a little below Poupart's ligament an aneurism existed as large as an egg.

After further consultation, it was decided that I should tie the femoral artery between the two small aneurisms, as we feared that a ligature on the external iliac would not command the hæmorrhage from the aneurismal sac ; and it appeared probable, that the superior aneurism, which was small and situated below the profunda, might become obliterated (if the circulation

Query—Had his occupation, which obliged him to mount very high ladders, been the means of producing this very extensive disease?

#### ANEURISMS LOCAL OR GENERAL.

When they occur opposite to a joint, a partial disease of the artery often gives rise to them; but, when they are seated in other parts of the body, there is usually a disease in the arteries, which produces a general disposition to their formation: the ultimate success of operations will depend very much upon the disposition to the disease being partial or general.

#### OF THE AGE AT WHICH ANEURISMS GENERALLY OCCUR.

The period of life at which they most frequently occur is between thirty and fifty years; at that age, in the labouring classes, the exertions of the body are considerable, and its strength often becomes diminished: in very old age this complaint is less frequent, as muscular exertion is less. The greatest age at which I have seen aneurism has been eighty years: this was in a man for whom I tied the femoral artery in Guy's Hospital, for popliteal aneurism; and, notwithstanding his advanced age, I never had an operation succeed better. I also operated upon a man of sixty-nine years, and that case also did well. A boy, in this Hospital, had an aneurism of the anterior tibial artery, who, I was informed, was only eleven years of age. The man of eighty was the oldest, and the boy of eleven the youngest, which I have seen with aneurism. Age with general good health, forms no objection to the operation.

through it were prevented) by coagula forming in it, as in a healthy artery. I therefore exposed the vessel in the usual manner, and placed a ligature on that portion which was situated between the two aneurisms; this was about one or one and a quarter inch in length, and appeared sound.

Four days after the operation, I left town for three weeks, during which time he remained under the care of my colleagues; the extremity became gangrenous, and the aneurismal sac in the ham sloughed, exposing the femur. A consultation was held, at which Sir Astley Cooper attended, about the propriety of amputating; but it was not thought advisable, on account of the diseased state of the arteries. The ligature did not separate from the wound until the sixth week; and the patient lingered until the 28th of July.

#### DISSECTION.

The popliteal and inferior femoral aneurisms of the left side had been destroyed by sloughing; that above the ligature was not closed. On the right side were found three femoral aneurisms, and a small popliteal, making in all seven; besides some dilatation of the aorta, immediately above the bifurcation.—T.



## OF THE SEX MOST DISPOSED TO ANEURISM.

The male is much more subject to this disease than the female : women are rarely the subject of aneurisms in the limbs ; the reason for which is, that they do not exert themselves so much as the other sex. In forty years' experience, taking the Hospital and private practice, I have seen only eight cases of popliteal aneurism in the female, but an immense number in the male. The aneurisms which I have seen in the female, have been the greater number in the ascending aorta, or the carotid arteries.

## OF THE FORMATION OF ANEURISM.

The first circumstance which occurs in an artery which is about to produce an aneurismal swelling is, that it becomes opaque and slightly inflamed ; a small yellow spot appears in the part where the aneurism is afterwards formed, and there is a slight efflorescence surrounding it ; a process of absorption next thins the coat of the artery, so that its texture becomes like a fine web of cellular tissue : at this time nature sets up a process of defence, which is beautifully exemplified in a preparation in St. Thomas's Museum ; it is an incipient aneurism of the aorta ; the coat of the artery has been absorbed, and opposite to the parts absorbed you observe a layer of adhesive matter, by which a defence is produced, and the progress of the disease for a time resisted ; a covering is formed by the adhesive inflammation, which strengthens the artery and prevents the immediate escape of blood. As the coat of the artery is absorbed, the part in the vicinity of the artery becomes united to its surface by the adhesive process : thus, if it be an aneurism of the ascending aorta, the pleura is united with it, and forms a portion of the aneurismal bag ; the pleura becomes absorbed and the lung forms a part of the sac, the lung and pleura costalis are absorbed in their turn, and the intercostal muscles and cartilages of the ribs form a part of the sac ; these removed by absorption, the pectoral muscle becomes the sac, and when this is absorbed, the skin, which is the only covering for the blood, inflames, dies, and sloughs in the way I have already described, and the person loses his life from hæmorrhage.

*Former Opinions.*—Aneurisms were formerly supposed to be produced by the dilatation of the coats of an artery, and those which arose from wounds or lacerations were called spurious ; but Scarpa first clearly described that aneurism arose from the absorption of the coats of an artery, and that consequently they are generally spurious.

## CAUSES OF ANEURISM.

*A diseased state of an artery.*—The general cause of aneurism is

a diseased state of the coats of an artery, by which it becomes altered in its appearance and thinner in its texture; but this, although the most frequent, is not the only cause of the disease, for sometimes the artery becomes dilated in its whole circumference. Two excellent specimens of this dilatation are to be seen in our museum. One, in which the general dilatation exists beyond the curvature of the aorta; and the other, in which it occupies the whole of the curvature.

*Laceration of an artery.*—Aneurisms are also produced by laceration of arteries, without any external wound, of which the two following instances have occurred in my practice: A gentleman, who was shooting, in leaping a ditch, slipped from the top of the bank; at this moment he felt something snap in his ham, and when he attempted to walk, he found himself lame from the accident: he was attended by Mr. Holt, surgeon, at Tottenham, and was afterwards brought to town, when he underwent the operation for popliteal aneurism: in this case the aneurism began to form in a very short time after the accident, and it was about a month after it that the operation was performed. The other case was as follows: A gentleman whom I was attending for a bad stricture in his urethra, in attempting to raise himself in bed upon his hands, felt something snap in the back of his right hand; when I next visited him, he told me the circumstance, and desired me to look at a swelling upon his hand; placing my finger upon it, I felt a pulsating swelling; I tried what could be effected by pressure, but this did not succeed, and I found it necessary to open the tumour; it discharged a large quantity of arterial blood, in part coagulated, which proceeded from the radial artery, under the extensor tendons of the thumb; I tied that artery at the place at which the pulse is usually felt, and I tied it beyond the extensor tendons, between the thumb and fore-finger. A punctured wound made into an artery, or a small incision, will occasion an extravasation of blood into the cellular tissue, which will render the operation for aneurism necessary for its cure.

#### OF THE DISSECTION OF ANEURISM.

When an aneurismal sac is opened and turned back, the cavity in which the blood is contained is not immediately exposed, but numerous layers of fibrous matter line the inner part of the sac, and form laminæ within each other; within which the fluid blood is contained; these laminæ are largest towards the sac, and form a portion of a lesser circle as they approach the fluid blood; these being removed, and the fluid or the recently coagulated blood, being spunged away, the orifice of the artery into the sac is directly seen; sometimes this orifice is small, and is formed by a portion of the circumference of the artery; and is sometimes large, the whole circumference of the artery having given way.

### DIAGNOSIS OF ANEURISM.

Aneurism may be distinguished from other diseases by the following marks: if the aneurism be small, press the artery which leads to it, and you will empty the aneurismal bag; but if the aneurism has existed long, is very solid, and its pulsation not very strong, sit by the patient's side, observe carefully the size of the swelling; press your finger on the artery above, and the aneurism will sink under the pressure on the artery; upon giving up that pressure suddenly, a jet of blood rushes into the aneurismal bag, and raises it to its former height.

In a doubtful case of aneurism of the groin, Mr. Brodie informed me every doubt vanished upon applying the stethoscope.

If a tumour, not aneurismal, has an artery of large size passing over it, a pulsation is produced which is liable to deceive. I was asked to see a glandular tumour in the neck, over which the carotid artery took its course, and which was easily distinguished from aneurism by the line of pulsation produced by the artery, whilst the lateral parts of the tumour had no pulsation. When a tumour is situated upon an artery, and derives pulsation from it, it may be distinguished from aneurism by elevating the swelling from the artery which deprives the tumour of its pulsation.

Pulsating tumours in the neck are common, and may be distinguished from aneurism, by desiring the patient to make an effort to swallow. Carotid aneurisms generally do not move with the larynx or trachea: other pulsating tumours in the neck are, for the most part, connected with the thyroid gland, and obey the motions of the air tube in swallowing.

### ON THE SPONTANEOUS CURE OF ANEURISM.

Patients should know that this disease, which is generally hopeless without operation, sometimes undergoes a spontaneous cure, for it is a great consolation for them to know this. I have known many examples of this change in aneurism, and will relate one of the most striking: George Bowie was admitted into Guy's Hospital, with an aneurism in the groin; when the aneurism had acquired considerable magnitude, as he was sitting by the fire in his ward, he suddenly felt a snap in the swelling; his leg and thigh became immediately swollen and useless, and the patients assisted him into bed. The pulsation in the swelling continued for four days, and then ceased; the swelling of the limb gradually subsided, and four months afterwards he was able to walk, with scarcely any lameness: I met him one day in the square of the Hospital, and asking him how he was, he said "Sir, I am pretty well of my old complaint, but I have got something alive in my inside;" and upon applying my hand to his abdomen, I found a



pulsating tumour: he died from the bursting of this aneurism into the abdomen. I examined him, and we have the parts preserved in the Museum of St. Thomas's Hospital. The aneurism of the thigh had burst under the fascia lata, and the accumulated blood pressed the aneurism on the femoral artery, so as to interrupt the circulation. Both the iliac and upper part of the femoral artery were obliterated, and the blood found its course by the internal iliac vessels.

I have seen spontaneous cures of aneurism produced without any circumstance which would readily explain the cause: one case with Sir William Blizard, at Walworth; a case of popliteal aneurism; and another of popliteal aneurism in Guy's Hospital. Mr. Ford has published cases of this description; and Dr. Baillie has met with similar instances. I once saw, in Guy's Hospital, a man who had an aneurism in the thigh, which had existed several years; which still retained its pulsation, but had ceased to increase, although it had not diminished: this man died of some other disease; and upon examination, I found it to be aneurism produced by the general dilatation of the coats of the artery.

#### ON THE TREATMENT OF ANEURISM.

*Little done by medical treatment.*—From the medical treatment of this disease, I must confess that I have seen but little advantage. Mr. Brown, a surgeon, who had an aneurism of the aorta, was exceedingly strict in his diet, and in his exercise; but he lived only a very few months. A gentleman, who had an aneurism of his aorta, took four ounces of food three times a day, and refrained almost entirely from exercise; and although he began this plan in August, almost as soon as the disease was distinctly discovered, yet he died in the following February. The result of my observation is, that two measures only are useful; the one abstraction of blood from the arm, when the pulse is hard and full, from which I have seen undoubted benefit arise: the other, the administration of the carbonate of soda, in considerable doses, which, with entire rest, seem to prevent the increase of the swelling; but the soda is at last obliged to be abandoned, on account of its producing petechiæ: the irritability of the body is often so increased by an antiphlogistic treatment, that the quickness of the pulse which follows, does as much injury as the natural force of circulation.

## LECTURE XV.

## ON THE OPERATION FOR ANEURISM.

As aneurism leads to a gangrenous state of the limb, as well as to the bursting of the aneurismal bag, and subsequently hæmorrhage; it therefore becomes necessary, in order to preserve the life of the patient, that an operation should be performed, to check the progress of the disease. The operation for it is one of the greatest triumphs of our science; it is founded upon a knowledge of anatomy, upon the best physiological principles, and upon a thorough acquaintance with the nature of the disease. To that stupendous genius, Mr. Hunter, is mankind indebted for it; before his time an operation had been performed so rarely successful, that surgeons doubted whether it were best to perform it, or to amputate; and I can recollect seeing a man, who regularly came to St. Thomas's Hospital to show himself, because he was thought to be a curiosity in having recovered from the operation for popliteal aneurism; this was forty years ago; the operation then consisted in applying a tourniquet upon the limb, in making an extensive incision into the aneurismal bag in the direction of the artery: in removing the layers of fibrin accumulated in the sac with the hand, and in spunging the bag clean. The tourniquet being then loosened, the openings from the artery were seen; a probe was passed into the orifice towards the heart, and a ligature was tied round that part of the artery; a probe was carried into the orifice towards the foot, and a ligature was made to surround that portion of the artery: thus a ligature was applied above and below the opening in the sac, and the wound was attempted to be healed as any other in which ligatures are introduced: high constitutional irritation followed this operation, extensive suppuration succeeded, hæmorrhages were frequent consequences, and its issue was generally unsuccessful.

The plan of Dr. Hunter had extensive scientific, and pathological views; the principle of his operation was, to direct the blood into new channels; and, instead of disturbing the diseased parts, to leave them to be absorbed by the processes of nature. The whole of his operation, then, in principle, consisted in tying the artery which led to the aneurism, in preventing it any longer from receiving blood from the heart, and in directing the blood into new and anastomosing channels.

## OF THE OPERATION FOR POPLITEAL ANEURISM.

It is proper that this operation should be performed before the foot and leg be much swollen. If the patient be of full habit, I find there is no objection to taking away blood from the arm, two

or three weeks prior to the operation, and the patient for a week before should avoid any stimulating food.

*Instruments required.*—The instruments required are, a common scalpel, a silver knife, a curved-eyed probe of half the usual length of probes, threaded with Dutch twine.

*Place of Incision.*—The place of the incision is one-third of the length of the thigh from the anterior superior spinous process of the ilium, to the internal condyle of the os femoris. Mr. Hunter performed it just above the tendon of the triceps femoris; but the artery is more deeply-seated there, and has more vessels opening from it which are in danger of injury.

*Position of the patient.*—The patient is placed upon a table of convenient height, in the recumbent posture, with his shoulders a little elevated, and his leg slightly bent to relax the sartorius muscle.

*Length of the first incision.*—The incision is to be four inches long; its direction that of the sartorius muscle, and just upon its inner edge. Any large branch of the saphena vein is to be avoided, and the first incision is to expose the fibres of the sartorius.

The second incision is to separate the inner edge of the sartorius from the adductor longus femoris, and this merely divides the cellular tissue. The sartorius is then gently drawn outwards, and the sheath of vessels becomes exposed, in which the artery, being more superficial than the vein, may be felt pulsating. A third incision opens the sheath, and this must be done with caution, as the sheath is to be divided over the artery. A septum is found between the artery and vein. The point of the silver knife may be here most safely used, to farther open the sheath, and to admit the probe. The probe is to be introduced under the artery with great care, to avoid injury to the vein, and to exclude any branch of nerve, as I have known the saphenus nerve included in the ligature, and numbness produced in the course of the saphena vein. The probe being brought out at the wound, the ligature is then left under the artery. All this is to be effected with as little disturbance to the artery as possible. The ligature is to be then tied, first passed through twice, and then only once in making the knot secure. If any small vessel bleeds in the operation above the site of the ligature upon the artery, let it be immediately secured by a thread; as, from the interruption to the circulation in the principal vessel, the smallest artery is apt to bleed freely. Directly as the ligature is made secure, the pulsation in the tumour generally ceases; I say generally, because I have known an obscure pulsation remain through the influence of anastomosing vessels.

*Dressing the wound.*—When the ligature has been securely tied, cut off one of its ends, and leave the other hanging from the centre of the wound. Bring the edges of the skin exactly together, and secure them by adhesive plaster, leaving small interstices to permit the escape of discharge. Do not apply any bandage, and let the patient be carried to bed in the recumbent posture. Place the limb



in a slightly-bent position, rather on its outer side, and the foot is to be wrapped in flannel.

*Other modes of operating.*—These are the steps of the operation; attempts have been made by ingenious surgeons to improve upon this mode of performing it, and one of the best proposals for this purpose was made by Mr. Cline. As hæmorrhage sometimes occurs at the time the ligature separates, he proposed to prevent ulceration of the artery by using a broad ligature, tying it upon a piece of cork, and removing it after some days, before ulceration usually begins. The first operation succeeded; but he afterwards found the introduction of an extraneous body produced too much irritation.

*Mr. Crampton's.*—Mr. Crampton, of Dublin, used an ingenious instrument, which he called the *presse artère*, with the same view.

*Dr. Jones's.*—Dr. Jones (author of an excellent work on the natural means of suppressing hæmorrhage) having found that small ligatures cut the inner coat of an artery without injury to the external, advised that the ligature should be tightly tied, and then removed, the artery being left to adhere when it was exposed. I tried this plan in two instances.

*Experiments.*—The first was in a case of popliteal aneurism in Guy's Hospital. I put a ligature around the femoral artery at the usual place; and tying it very tight, after thirty hours I loosened it. The pulsation in the aneurism returned after half a minute with the same force as prior to the operation; I, therefore, again tightened the ligature, and suffered it to remain forty-two hours longer; after seventy-two hours I removed the ligature, and the pulsation did not return; thirteen days after, as I entered the square of the Hospital, one of my dressers informed me, the man had hæmorrhage from the femoral artery. I visited him immediately, and found it to be so; a tourniquet was applied just above the wound, the hæmorrhage did not return, and the patient recovered.

The second case was an aneurism of the radial artery, produced by a wound; I removed the ligature twenty-four hours after it had been applied, but the pulsation returned; I made an incision into the tumour, applied a ligature upon the artery above and below the openings into the sac, and the aneurism was cured.

*Mr. Abernethy's.*—Mr. Abernethy proposed a new and very ingenious mode of operating for this disease, by placing two ligatures upon the artery, and dividing the vessel between them; thus reducing the extremity of the vessel nearest to the heart, to the state in which it is in a stump. I have often performed this operation, and very successfully; and I think it ought to be adopted in all cases in which the artery is much disturbed in the operation, and separated from the surrounding cellular tissue; as the division of the artery enables it to retract into the cellular membrane above; it is liable, however, to one objection, viz. to the ligature escaping from the artery soon after its application; this happened to Mr. Cline, sen. in St Thomas's Hospital, and to myself in Guy's Hospital;

both ligatures came off the artery as I divided it, but I immediately replaced them.

*Of cutting off both ends of the ligature.*—It has been recommended to cut off both ends of the ligature close to the knot, in the hope that the wound would heal over it, and that it would remain without producing inflammation; but experience has shown that it separates by ulceration, and often produces a considerable degree of irritation.

#### OF THE AFTER TREATMENT OF THE PATIENT.

*Application of flannel.*—A piece of flannel is to be placed around the limb, or a warm stocking to be worn, to preserve the warmth of the limb, for there is danger of gangrene in cold weather; the heat of the foot is generally two degrees more than that of the sound side; but if it be exposed to the influence of low temperature, it is easily robbed of the heat which is necessary to its preservation. Before I learned this, I had operated upon a young gentleman during the winter, who, when I visited him in the evening, complained of great coldness, numbness, and a sense of weight in his foot; this induced me to look at the limb, and I found that the foot was quite cold, and that the blood was stagnant in it. I sat down by the bedside of the patient, and rubbed his leg with a warm flannel till heat was restored to the limb; and ever since that time I have wrapped the limb in a piece of flannel, and sometimes put bottles filled with hot water to the feet, if the weather be particularly cold.

For a few days after the operation, a considerable degree of constitutional irritation is produced; and I have in two or three instances known retention of urine occur, rendering the introduction of the catheter necessary. The medicine best suited to the patient is a simple saline draught with sulphate of magnesia; and opium may be administered, if there be any considerable degree of irritability. Great care must be taken that the patient does not rest too much upon his heel, as a gangrenous spot is apt to form there, if that be permitted; the patient must make no effort to use the limb, as any disturbance of the sartorius muscle prevents the ready adhesion of the wound. Every other day will be sufficient for the reapplication of the dressings; and for the first four days, at least, they should not be disturbed.

*Separation of the ligature.*—Between the eleventh and fifteenth day the ligature usually separates, but I have known a broad ligature twenty-seven days in ulcerating. Nothing must be done to assist the separation of the ligature; leave it entirely to a natural process. For three or four days after the ligature has separated, carefully guard the patient from raising himself in bed, for the following reason.

*Case.*—A sailor endeavouring to push his pocket knife through a cable, which was placed between his thighs, the knife slipped,

and entered his femoral artery; a profuse hæmorrhage ensued; a tourniquet, made by a handkerchief and stick at the moment, was put around the limb, and he was brought to Guy's Hospital. I put a ligature above and below the wound in the artery, and on the fourteenth day these ligatures separated: at twelve o'clock the same day he was sitting in his bed washing his hands, when a gush of blood took place from the wound. A tourniquet was directly applied by the dresser, and I was sent for. The hæmorrhage proceeded from the portion of the artery nearest the heart, upon which I placed a ligature, which rendered it necessary for the man to keep his bed for three weeks longer; but he ultimately recovered: this shows the necessity of perfect stillness on the part of the patient, whilst the ligature is separating and the adhesion is remaining feeble.

*Mode in which circulation is carried on.*—After this operation the circulation is carried on principally by the arteria profunda; its branches communicate with the articular arteries of the popliteal, and with arteries sent to the knee by the anterior and posterior tibial; large branches in the sciatic nerve, sent off by the arteria profunda, communicate very freely with the popliteal artery, the articular of the knee joint, and with branches of the posterior tibial artery; the freedom of anastomosis now and then leads to a reproduction of an aneurism, of which you have all had an opportunity of seeing an instance during the present season in Guy's Hospital. The femoral artery had been tied last year by Mr. Key, and the man was discharged cured; but during the present season he has returned with a very painful tumour in the ham, having an obscure pulsation in it, the flexor muscles of the knee were extremely rigid, and the man's health was giving way so rapidly, that I was obliged to amputate the limb, and a large artery which passed to the tumour was obliged to be secured nearly in the situation usually occupied by the femoral artery.

*Subsequent gangrene.*—I have known the operation fail in three or four instances from gangrene of the leg which demanded amputation.

*Hæmorrhage.*—I have also seen it several times fail from hæmorrhage, but more frequently formerly than of late years; now the principles of the operation are so well understood.

This, however, occurs in some instances, on account of the artery not being closed at the time the ligature separated, in consequence of which the patient has been destroyed by hæmorrhage; this arose from a deficiency of power in the constitution, so that the necessary degree of inflammation had not been produced, or from a diseased state of the artery itself.\*

\* A case of this nature occurred to Mr. Bransby Cooper, of which the following are the particulars:

On the 9th of June, 1823, Mr. Gaitskell, of Rotherhithe, was requested to see J. C. Esq. æt. 49, on account of the sudden appearance of a swelling on



*Case.*—Mr. Birch lost a patient in St. Thomas's Hospital, from the femoral artery being tied too near to the arteria profunda to allow of adhesion of the inner coats of the artery, and consequently to prevent hæmorrhage.

#### OF ANEURISM OF THE ANTERIOR TIBIAL ARTERY.

If this disease be placed at the upper part of the leg, the same operation is required for it as that which is performed for popliteal aneurism. Mr. Lucas, sen. surgeon of Guy's Hospital, had a patient with anterior tibial aneurism seated a little below the head of the fibula. He performed the operation of tying the femoral artery, and the pulsation in the aneurism ceased, and the swelling for a time subsided. The case did not ultimately recover, for a slough took place of the aneurismal sac; but the failure arose not from the operation being inappropriate, but from a very unhealthy constitution. Mr. Henry Cline had a case of this disease upon the upper part of the foot, and he tied the anterior tibial artery at the lower part of the leg, but the pulsation in the aneurism continued when the boy quitted the Hospital. It will be, therefore, right to

the upper part of the left thigh, three inches below Poupart's ligament; which proved to be a femoral aneurism. Sir Astley Cooper was consulted, and but little pulsation existed in the tumour, he thought a spontaneous cure might take place, and recommended that the patient should adopt those measures most likely to assist the efforts of nature. On the 21st of June, however, Mr. C., whilst in the act of raising himself in bed, felt something give way in the thigh; this was immediately followed by a rapid increase of the swelling, which soon extended to Poupart's ligament. Sir A. Cooper was sent for, but being out of town, his nephew (Mr. Bransby Cooper) attended for him, and after a consultation with Mr. J. H. Green, a ligature was placed on the external iliac. The operation was performed with great facility in the usual manner.

Every thing went on favourably for eighteen days after, when a slight arterial hæmorrhage took place from the wound, which returned at intervals on the 19th, 20th, and 21st days: when it entirely ceased for forty-eight hours. The wound appeared healed, excepting near the ligature, around which a glassy granulation protruded. On the 24th, 25th, and 26th days, the bleedings returned oftener and more violently than before, but were checked for a time by pressure and cold applications; the patient became much exhausted from the repeated loss of blood, and the wound again opened. On the 27th, a profuse hæmorrhage supervened, which separated the ligature, and an hour after the patient expired.

#### DISSECTION.

The artery was completely divided, and the extremities were above an inch apart. The superior portion was slightly glued to the psoas muscle by adhesive matter; it contained a small loose coagulum, but there was not the slightest appearance of any adhesive process internally. The inferior portion was also open, but did not contain any coagulum. The coats of the artery were extremely thin and semitransparent, having much more the character of the coats of a vein than an artery.—T.

tie the artery by opening the sac, so as to secure it above and below the aperture, if the aneurism be seated low down in the limb, as the anastomosis with the planter arteries is exceedingly free.

#### OF ANEURISM OF THE POSTERIOR TIBIAL ARTERY.

I have tied the femoral artery for an aneurism, under the calf of the leg, in the posterior tibial artery, in a man of the name of Fox, aged sixty-nine years, who proceeded quite favourably.

#### OF INGUINAL ANEURISM.

The femoral artery sometimes forms an aneurism just opposite the hip-joint and below Poupart's ligament. I have also seen it at the origin of the arteria profunda; but if the aneurism be placed any where between the groin and the middle of the thigh, it is best to tie

#### THE EXTERNAL ILIAC ARTERY.

*Mode of operating.*—The operation is performed as follows: The patient being placed in the recumbent posture on a table of convenient height, the incision is begun just above the abdominal ring, and is extended downwards in a semi-lunar direction to the upper edge of Poupart's ligament, and again upwards, to within an inch of the anterior and superior spinous process of the ilium. This incision exposes the tendon of the external oblique muscle: in the same direction the above tendon is to be cut through, and the lower edges of the internal oblique and transversalis abdominis muscles are exposed; the centre of these muscles is then to be separated from Poupart's ligament; the opening by which the spermatic cord quits the abdomen, is thus exposed, and the finger passed through this space is directly applied upon the iliac artery above the origin of the epigastric and circumflex ilii arteries. The iliac artery is placed upon the outer side of the vein; and the next step of the operation consists in gently separating the vein from the artery by the extremity of a director, or by the end of the finger. The iron curved aneurismal needle is then passed under the artery, and between it and the vein from without inwards, carrying a ligature, which being brought out at the wound, the needle is withdrawn, and the ligature is then tied around the artery, as in the operation for popliteal aneurism. One end of the ligature being cut away, the other is suspended from the wound, the edges of which are brought together by adhesive plaster, and the wound is treated as any other containing a ligature.

Amid the many cases of this operation which I have had occasion to perform, two of them have been in medical men, Mr. J. of Stamford, and Mr. C. of Worcester, both of whom are now living. One unfortunate case only occurred, in which I lost the patient from

hæmorrhage, which took place on the fifteenth day after the operation. I applied another ligature, but the man sunk from the debility consequent on the loss of blood.

#### THE INTERNAL ILIAC ARTERY

Has been tied by Mr. W. Stevens, surgeon in the island of Santa Cruz, for the cure of a large aneurism of the left gluteal artery. The following account of the operation has been published in the fifth volume of the Medico-Chirurgical Transactions :

*Operation.*—An incision, about five inches in length, was made on the left side, in the lower and lateral part of the abdomen, parallel with the epigastric artery, and nearly half an inch on the outer side of it. The skin, the superficial fascia, and the three thin abdominal muscles, were successively divided; the peritoneum was separated from its loose connexion with the iliacus internus and psoas muscles; it was then turned almost directly inwards, in a direction from the anterior superior spinous process of the ilium, to the division of the common iliac artery. In the cavity which I had now made I felt for the internal iliac, insinuated the point of my forefinger behind it, and then pressed the artery betwixt my finger and thumb. Dr. Lang now felt the aneurism behind; the pulsation had entirely ceased, and the tumour was disappearing. I examined the vessel in the pelvis; it was healthy and free from its neighbouring connexions; I then passed a ligature behind the artery, and tied it about half an inch from its origin. The tumour disappeared almost immediately after the operation, and the wound healed kindly. About the end of the third week the ligature came away, and in six weeks the woman was perfectly well.

The case in which I put a ligature on the aorta, has been published in the first part of the Surgical Essays. I shall, therefore, only give a short extract from it here.

#### LIGATURE ON THE AORTA.

*Case.*—Charles Hutson, a porter, æt. 38, was admitted into Guy's Hospital, on the 9th of April, 1817, for an aneurism in the left groin, situated partly above and partly below Poupart's ligament. The swelling was very much diffused, and pressure upon it gave considerable pain. On the third day after he had been in the Hospital, the swelling increased to double its former size, and extended from three to four inches above Poupart's ligament to an equal distance below it, and was of great magnitude. Just below the anterior and superior spinous process of the ilium, a distinct fluctuation could be felt in the aneurismal sac, so that the blood had not evidently yet coagulated; and the peritoneum was carried far from the lower part of the abdomen, in such a manner as to reach the common iliac artery, and to render an operation impracticable without opening the cavity of the peritoneum. I therefore



was extremely averse to perform an operation, and determined to wait and see if any efforts would be made towards a spontaneous cure.

He was occasionally bled, kept perfectly quiet, and pressure was applied on the tumour. June 19th, a slough was observed on the exterior part of the swelling below Poupart's ligament, which, in part, separated on the 20th, and he had some bleeding from the sac, but it was easily stopped by a compress of lint, confined on the part by adhesive plaster. On the 22d, after some slight exertion, he bled again, but not profusely. 24th, the bleeding again recurred, but stopped spontaneously. 25th, about half-past two o'clock, in consequence of a sudden mental agitation, bled profusely, and became so much exhausted, that his fæces passed off involuntarily; but Mr. Key, then my apprentice, succeeded in preventing immediate dissolution by pressure. At nine o'clock the same evening I saw him, and found him in so reduced a state, that he could not survive another hæmorrhage, with which he was every moment threatened. Yet still anxious to avoid opening the abdomen, to secure the aorta near to its bifurcation, I made an incision into the aneurismal sac, above Poupart's ligament, to ascertain if it were practicable to pass a ligature around the artery from thence. On introducing my finger, I found that the artery entered the sac above and quitted it below, without there being any intervening portion of vessel; I, therefore, was obliged to abandon that mode of operating; and as the only chance which remained of preventing his immediate dissolution, by hæmorrhage, was by tying the aorta, I determined on doing it. The operation was performed as follows:

*Operation.*—The patient's shoulders were slightly elevated by pillows, in order to relax, as much as possible, the abdominal muscles; for I expected that a protrusion of intestines would produce embarrassment in the operation, and was gratified to find that this was prevented by their empty state, in consequence of the involuntary evacuation of the fæces. I then made an incision, three inches long, into the linea alba, giving it a slight curve, to avoid the umbilicus: one inch and a half was above, and the remainder below the navel. Having divided the linea alba, I made a small aperture into the peritoneum, and introduced my finger into the abdomen; and then with a probe-pointed bistoury enlarged the opening into the peritoneum to nearly the same extent as that of the external wound. During the progress of the operation, only one small convolution of intestine projected beyond the wound.

Having made a sufficient opening to admit my finger into the abdomen, I passed it between the intestines to the spine, and felt the aorta greatly enlarged, and beating with excessive force. By means of my finger nail, I scratched through the peritoneum on the left side of the aorta, and then gradually passed my finger between the aorta and spine, and again penetrated the peritoneum, on the right side of the aorta.

I had now my finger under the artery, and by its side I conveyed

the blunt aneurismal needle, armed with a single ligature behind it; and Mr. Key drew the ligature from the eye of the needle to the external wound, when the needle was withdrawn.

The next circumstance, which required considerable care, was the exclusion of the intestine from the ligature the ends of which were brought together at the wound, and the finger was carried down between them, so as to remove every portion of the intestine from between the threads: the ligature was then tied, and its ends were left hanging out of the wound.

During the operation the *fæces* passed involuntarily, and the patient's pulse, both immediately and for an hour after the operation, was 144 in a minute. I applied my hand to his right thigh, immediately after the operation, and he said that I touched his foot, so that the sensibility of the leg was very imperfect.

The omentum was drawn behind the opening as far as the ligature would admit, so as to facilitate adhesion; and the edges of the wound were brought together by means of a quilled suture and adhesive plaster.

He remained very comfortable until the following evening, when he vomited, and his *fæces* passed off involuntarily. 27th, Seven o'clock A.M. had passed a restless night, and had vomited at intervals; pulse 104, weak and small; pain in his head; great anxiety of countenance; very restless, and his urine dribbled from him. He gradually sunk, and died at eighteen minutes after one o'clock, having survived the operation forty hours.

#### DISSECTION.

No peritoneal inflammation, but at the edges of the wound, which were glued together by adhesive matter, excepting at the part at which the ligature protruded. The thread had been passed around the aorta, about three-quarters of an inch above its bifurcation, and rather more than an inch below the part at which the duodenum crosses the artery; it had not included any portion of omentum, or intestine. Upon carefully cutting open the aorta, a clot, of more than an inch in length, was found to have sealed the vessel above the ligature; below the bifurcation, another, an inch in extent, occupied the right iliac artery; and the left was closed by a third, which reached as far as the aneurism: all were gratified to observe the artery so completely shut in forty hours. The aneurismal sac, which was of a most enormous size, reached from the common iliac artery to below Poupart's ligament, and extended to the outer part of the thigh. The artery was deficient from the upper to the lower part of the sac, which was filled with an immense quantity of coagulum.\*

\* In an operation which I lately performed of tying the external iliac artery much above Poupart's ligament, I think I could with little difficulty have reached the aorta, by turning up the peritoneum without dividing it; and should I again wish to put a ligature on the aorta, I should prefer this method to the one I have before adopted.

## ANEURISM OF THE CAROTID.

I have twice performed the operation of tying the common carotid, on account of the existence of aneurism; and as both these cases have been already published in the first volume of the *Medico-Chirurgical Transactions*, it will be only necessary to give a short account of them here, and of the mode in which this operation is to be performed.

*Case.*—The first case is that of Mary Edwards, æt. 44. The swelling occupied two-thirds of the right side of the neck, pulsated very strongly, and the integument at the most prominent part of the tumour appeared very thin. It had existed six months previous to the operation, which was performed as follows: On November 1, 1805, I made an incision, two inches long, on the inner edge of the sterno mastoid muscle, from the inferior part of the tumour to the clavicle, which laid bare the omo and sterno-hyoideus muscles, which being drawn aside towards the trachea, exposed the jugular vein. The motion of this vein produced the only difficulty in the operation; as, under the different states of breathing, it sometimes presented itself to the knife tense and distended, and then as suddenly collapsed. Passing my finger into the wound, to confine that vein, I made an incision upon the carotid artery, and having laid it bare, I separated it from the par vagum, and introduced a curved aneurismal needle under it, taking care to exclude the recurrent nerve on the one hand, and the par vagum on the other. The two threads were then tied about half an inch asunder, being the greatest distance to which they could be separated: on account of the short space, I did not divide the artery. As soon as the threads were tied, all pulsation in the tumour ceased, and the wound was superficially dressed.

Immediately after the operation she was seized with a severe fit of coughing, which continued half an hour, when she became more tranquil, and slept six hours during the following night. She continued in a favourable state until the eighth, when it was observed that her left arm and leg were paralytic: she was restless, but had not any pain in the head. 9th. Could not swallow solids, and felt occasional pricking pain in the wound. 11th. Power of motion of the left arm returned, and she appeared going on favourably. 12th. The two ligatures came away with the intervening portion of artery. She went on well until the 17th, the tumour reducing, and the wound healing; when the wound again opened, the tumour increased and was painful; she had a violent cough, great difficulty in swallowing, and a high degree of constitutional irritation. From this time she gradually got worse, and died on the 21st.



## DISSECTION.

Inflammation of the aneurismal sac, which contained coagula and pus: the inflammation extended nearly to the basis of the skull, in the course of the par vagum. The glottis was almost closed, and the internal surface of the trachea was inflamed, fibrin adhering to its mucous membrane. Owing to the pressure of the tumour, the pharynx would scarcely admit a bougie of the size of a goose quill. The cause of her death then was the inflammation of the aneurismal sac and of the adjacent parts, by which the size of the tumour became so increased as to press on the pharynx and prevent deglutition, and upon the larynx, so as to excite coughing, and to impede respiration.

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*Case.*—Humphrey Humphreys, æt. 50, an iron porter, had an aneurismal tumour on the left side of the neck, about the size of a walnut, extending from the angle of the jaw to the thyroid cartilage. He had observed it about six months previous to the operation, and it was accompanied with violent pain in the head, and a sense of pulsation in the brain. When the sac was emptied by pressure on the artery below, the tumour regained its original size by one contraction of the heart.

The operation was performed at Guy's Hospital, on the 22. of June, 1808, in the same manner as in the preceding case, only that the artery was divided between the ligatures. The pulsation in the tumour did not, however, entirely cease; but the pain in the head subsided immediately, and did not again return.

The patient had scarcely an unpleasant symptom following the operation; the wound healed, as far as the ligatures would permit, by adhesion; the ligatures came away on the 14th and 15th of July; the tumour gradually diminished, but an obscure pulsation existed in it, until the beginning of September, when it could not be felt. The wound closed slowly, and the man returned to his employment on the 14th of September.

## SUBCLAVIAN ANEURISM.

The operation for tying the subclavian artery was first successfully performed by Dr. Post, of New York, and since by Mr. Lister, Mr. Todd, Mr. Gibbs, Baron Dupuytren, Mr. Key, and others. The following were the steps of the operation in Mr. Key's case:

The patient being laid upon an inclined plane, formed by the lithotomy table, so that the light from a large sky-light could be thrown into the triangular space in which the artery lies imbedded; I drew the integuments down over the clavicle, and cut freely upon the bone, beginning the incision about half an inch over the clavi-

cular portion of the sterno-mastoid, and continuing it outwards for about three inches. The integuments being relaxed, the incision became raised about a third of an inch above the clavicle, and exposed the platysma myoides, which was divided to the same extent. Several turgid veins were now exposed upon the cervical fascia, to avoid which was impossible; they were therefore divided, and about three ounces of blood lost; one, larger than the rest, Mr. Travers secured, to prevent any obstruction in the aftersteps of the operation. The outer layer of the cervical fascia was then divided by the knife, and the loose cellular texture, enveloping the glands of the neck, being detached by the finger, the omo-hyoideus muscle was laid bare; a little farther dissection then discovered the artery to the finger; but the depth of the angle, in which it was enclosed, rendering it impossible to pass a ligature under it in so confined a space; about half an inch of the sterno-mastoid was divided, which gave considerable room. The artery was then exposed by means of a director, and the aneurismal needle was readily conveyed under it, by passing it from below upwards. The method I adopted to prevent any difficulty in passing the ligature under the vessel, is detailed in the *Medico-Chirurgical Transactions*. It is now a twelvemonth since the operation was performed; the pulse in the radial artery is scarcely perceptible, although the man enjoys very good use of the limb, and is otherwise in perfect health.

#### ANEURISM OF THE BRACHIAL ARTERY.

I do not remember to have seen a case of aneurism from disease in the brachial artery; but I have seen several at the elbow joint, arising from a wound of this artery; and as the treatment is the same in each, I will describe the operation which is required:—An incision is made in the middle of the arm between the shoulder and elbow, on the inner edge of the biceps flexor cubiti, of three inches in length, which directly exposes the brachial artery, its vena comites, and the median nerve: the artery is to be a little dissected from the nerve and veins, and then a probe is to be carried under the artery, armed with a ligature; the probe is to be withdrawn leaving the ligature under the vessel; the ligature is then to be secured, as in the former operations, with as little disturbance to the artery as possible; one end of the thread is to be removed, whilst the other is suffered to remain between the edges of the wound, which are to be nicely adjusted with adhesive plaster. It is better not to make an incision upon the artery at the elbow joint, as most important parts are divided, and constitutional irritation runs so high as to occasion the destruction of life, as the following case explains:

*Case.*—One of our young gentlemen at Guy's Hospital, in bleeding a patient, recently admitted for an accident, had the misfortune to prick the artery; the jet of blood, its arterial colour, and the quantity lost in a short time (being thirty-seven ounces,) immedi-

ately informed him of the nature of the injury. He bound up the arm as tightly as the patient could bear, and succeeded in suppressing the hæmorrhage; but on the fourth day the tightness of the bandage produced so much pain, that the patient could bear it no longer, and he requested that it might be somewhat loosened; but so soon as this was done, the bleeding was renewed, and one of the surgeons of the Hospital was sent for; he made an incision upon the artery at the elbow joint, where it had been injured; the operation was exceedingly tedious and difficult, but at last the artery was secured above and below the opening; violent constitutional irritation succeeded, and, on the eighth day from his being bled, the man expired. The preparation taken from this man's arm is preserved in St. Thomas's Hospital.

*Old operation sometimes proper.*—When this aneurism acquires very great magnitude, it is proper to perform the old operation. I lately saw Mr. Morgan, surgeon of Guy's Hospital, perform this operation easily and adroitly, in a case of large aneurism.

#### ANEURISM OF THE ULNA ARTERY.

I have seen only one case of aneurism of the ulna artery from disease; it was in a patient of Mr. Chandler's, in St. Thomas's Hospital; the aneurism was seated where the artery dips under the pronator radii, teres, and flexor muscles of the hand. Mr. Chandler tied the artery above the swelling; it was an extremely difficult and tedious operation, and it would have been much better to have tied the brachial artery, either in the middle of the arm, or to have opened the aneurismal sac, and to have tied the artery above and below its opening. The patient died from the constitutional irritation resulting from this operation.

In aneurism of the ulna artery, situated at the wrist, it is right to open the sac, to tie the artery above and below the opening, taking care to exclude the ulna nerve, which closely accompanies the artery.

In aneurisms of the radial artery at the wrist, which are frequently occurring by wounds from glass, the aneurismal sac must be opened, and the artery tied above and below the opening. Mr. W. Cooper, formerly surgeon at Guy's Hospital, in performing this operation, found the upper portion of the radial artery obliterated, and that the aneurism was supported by regurgitation from the hand, from the free anastomosis with the ulna artery.

#### OF ANEURISM OF THE SCALP.

Those which I have witnessed are as follows:—an aneurism of the posterior aural artery, in a patient of Mr. Fry, surgeon, at Dursley, Gloucestershire, which had been produced by a blow from her husband. I opened the sac, and was compelled to tie not only



the vessel which led into the sac, but numerous others, entering in all parts of the circumference of the swelling.

I have seen several cases of temporal aneurisms from arteriotomy in that vessel. One in Mr. Hensleigh, a medical student. I opened the sac, secured the temporal artery at its lower part, and was then obliged to secure many others entering the circumference of the sac, which had been excessively dilated. One case I saw from Mr. Toulmin, of Hackney, produced by striking the temple against the corner of a dining table.

A young lady, whom Mr. Cline and myself have visited in consultation, has a large pulsating tumour in the forehead, above the eyebrow, the cause of which is unknown. In this case I propose to make a circular incision around the sac to the bone, to divide all the vessels which feed it, and then to make use of pressure upon it.

The operation best calculated to cure aneurisms of the scalp is to cut directly across them, and to make use of pressure to stop the bleeding, to prevent the course of the blood through the swelling, and to produce adhesion of the sides of the sac.

Aneurisms are to be prevented after arteriotomy by the complete division of the vessel.

#### OF THE ANEURISMAL VARIX.

When the brachial artery is punctured with the lancet through the vein in bleeding, an adhesion is sometimes produced between the one and the other; and the blood, flowing from the artery into the vein, causes an enlargement of the latter, opposite the elbow joint. The swelling is called aneurismal varix, from the enlargement of the vein, and from its connexion with the artery. The swelling of the vein acquires the size of a pigeon's egg, and then it usually ceases to increase. There is a pulsation in the swelling, with a thrilling sensation, and a hissing noise. If the artery be compressed above, the swelling becomes flaccid and can be emptied of its blood; but if the arm be compressed below the swelling, the pulsation continues, and the size of the swelling remains unaltered. The brachial artery, above the varix, becomes enlarged, owing to the greater quantity of blood which it conveys.

The swelling of the vein proceeds to the size which I have mentioned, and then becomes stationary. A woman, with this altered state of the circulation, used frequently to exhibit her arm to the students for many successive years, and it seemed to remain annually the same.

No operation has been required for this disease, in any case which I have seen of it, as it is not a dangerous state, either to the life or even to the arm. It renders the arm weaker, and nothing more serious arises from it.

*Case.*—Mr. Atkinson, a most respectable surgeon at York, sent

me an account of a case, in which an operation had been performed for this disease, and it proved fatal.

*Treatment.*—When the accident has recently occurred, it may be cured by the following plan :

*Case.*—A young lady was brought to my house by the surgeon who had the misfortune to prick the brachial artery in bleeding. The wound had healed, but an aneurismal varix followed, of the size of a pigeon's egg, attended with strong pulsation, a thrill, and a hissing noise. I ordered it to be compressed with a dossil of lint and a roller; but it did not succeed in subduing it. I then directed that a circle of iron should be put round the arm, with a pad, which could be screwed down on the brachial artery, in the middle of the arm, between the shoulder and elbow-joint. This she bore without much suffering, and gradually the swelling at the elbow subsided, and pulsation in the brachial artery and in the tumour could be no longer perceived. As the gentleman, who attended the case with me, was well acquainted with Mr. Abernethy, he took the young lady to Mr. Abernethy, at my request, to show him the cure of this disease.

## LECTURE XVI.

### ON HYDROCELE.

*Definition.*—HYDROCELE is an accumulation of fluid in the tunica vaginalis testis, producing a pyriform, fluctuating, and generally a transparent swelling in the scrotum.\*

*Symptoms.*—In this disease the symptoms are as follow : a swelling begins about the testis, unattended with pain, and is usually observed only by accident. It is at first flaccid, and the fingers readily sink through it, so that the testis can be distinctly felt. As it increases, the swelling becomes tense, and conceals the testis. It then assumes a pyriform shape, the largest part of the swelling is opposite to the testis, and as it rises towards the abdominal ring, its diameter gradually lessens. It is generally unattended with pain. Some few of the vessels of the scrotum are enlarged, but the skin does not appear to be inflamed, and the patient suffers no inconvenience but from its weight and its magnitude: his general health being unaffected.

*Transparency.*—Upon accurate examination of the swelling, it is found to be transparent; and, as some surgeons deny the truth of this, it must arise from their not understanding the mode of making

\* The term Hydrocele applies to any watery tumour; but it is now limited by surgeons to hydrocele of the tunica vaginalis, and to hydrocele of the spermatic cord.

the examination. The room is to be darkened; the patient holds a candle, burning brightly, close to the side of the scrotum, and the surgeon grasps the posterior part of the swelling, so as to render its fore part as tense as is possible; then the surgeon, looking at the swelling from the side opposite to the candle, and placing his left hand on the fore part of the scrotum, immediately discovers transparency. I have seen surgeons place a candle on one side, raise the scrotum, and look from the other, and say the swelling is not transparent; and in this way it scarcely ever will be. The strong light of the sun, falling directly on the part, answers equally well, in showing its transparency.

*Fluctuation.*—Hydrocele has a distinct fluctuation, which may be observed in the most distant parts of the swelling, by pressing with the fingers at remote parts. However, when it is excessively distended it feels hard.

*Situation of the testicle.*—The testis is generally placed two-thirds of the swelling downwards, and at the posterior part of the scrotum; pressure at that part gives the sensation of squeezing the testis, and when the swelling is transparent the testis may be seen there.

Hydrocele is a very moveable swelling;—if it does not distend the part much in the course of the spermatic cord, it bends easily upon the abdomen, and moves readily in all directions.

Such is the usual character of the disease; but sometimes, and not unfrequently, it is the result of inflammation of the testis, when it is preceded by pain, redness, hardness, and swelling of the part, which assumes more the form of the testis itself, and is less distinctly transparent.

*Nature of the fluid.*—The fluid which hydrocele contains resembles serum; like it, yellow and transparent; like it, coagulable by heat, by acids, and by alcohol: it coagulates in port wine and in solutions of the sulphate of zinc, used as injections.

#### VARIETIES OF HYDROCELE.

As this disease is subject to great varieties, it is necessary these should be particularly pointed out.

*On both sides.*—The disease sometimes exists on both sides of the scrotum, and when this happens the swellings must be cured in succession.

*Testicle on the fore part.*—The testis varies in its situation in this disease; it is sometimes glued to the fore part of the tunica vaginalis, and the serum is accumulated on each side of it. I was called to the following case:—A gentleman consulted a surgeon for a swelling in the scrotum, which he pronounced to be hydrocele. He put a trocar into it; no water followed, and he said “I am mistaken; this is a solid enlargement of the testis, and it must be removed.” The patient, excessively alarmed at so severe a sentence, said he should require time to think of it, and another surgeon was



consulted. When his clothes were loosened, venereal spots were observed upon the skin of the abdomen, and he had a node upon the tibia. Mercury and sarsaparilla were given him, and he got well of those symptoms. But the swelling remained in the scrotum, and was clearly an hydrocele, from its fluctuations and its transparency; but with the testis adhering to the anterior part of the tunica vaginalis. It was injected from the side instead of the fore part, and the patient perfectly recovered.

*Result of inflammation.*—When hydrocele is the result of inflammation of the testis, the water is accumulated (in consequence of an unnatural adhesion of the tunica vaginalis) above the testis, or below it, and upon either side.

In our collection at St. Thomas's, we have a preparation of the tunica vaginalis giving way posteriorly to the pressure of the water, and forming a new and additional sac.

*Two Swellings.*—Hydrocele sometimes forms two swellings, one in the scrotum, another at the abdominal ring, with a smaller swelling of communication between them:—this has much the appearance of hernia.

Two distinct hydroceles are sometimes formed upon the same side, of which the following is an example.

*Case.*—Mr. Roberts, surgeon, of Malmesbury, in Wiltshire, consulted Dr. Cheston, of Gloucester, respecting a patient of his who had hydrocele; and it was agreed that the water should be drawn off, which Mr. Roberts did in Dr. Cheston's presence; but they were both surprised to see a swelling remaining, half as large as at first, and which could not be emptied through the canula. The canula was therefore withdrawn, and soon after he was sent to London, where I saw him. I tapped the hydrocele, and a yellow serous fluid was discharged; but still half the swelling remained. I then darkened the room, ordered a candle, and examined the swelling, which extended from the upper part of the testis to the abdominal ring:—it was very transparent. I therefore tapped it, and drew off a fluid like water, quite free from colour. I afterwards injected the lower hydrocele, and repeatedly tapped the upper swelling. This additional swelling was either hydrocele of the cord, or a hernial sac closed at its orifice.

We have two preparations, in the collection at St. Thomas's Hospital, of a cyst growing between the tunica vaginalis and the tunica albuginea, upon the surface of the testis. I have seen another example of the same kind.

*Communicates with the abdomen.*—Hydrocele sometimes communicates with the abdomen: I have several times seen this circumstance in children; occasionally also in the adult. The following is an interesting case of the former. Mr. Dobson, of Harlow, sent me a young gentleman with hydrocele, which communicated with the abdomen. I wrote to Mr. Dobson to the following effect: "Our first step must be to apply a truss, and obliterate the communication of the tunica vaginalis with the abdomen, and then

we will inject the hydrocele." Many months afterwards, Mr. Dobson wrote me word that the truss had cured the hydrocele; for that, when the opening of the tunica vaginalis was obliterated by its pressure, the water became entirely absorbed. Where hydrocele communicates with the abdomen, and there is abdominal dropsy, it is very convenient to tap the patient through the scrotum.

*Usual quantity of fluid.*—The usual quantity of fluid in hydrocele is from six to eight ounces; but the largest hydrocele I have heard of was that of Mr. Gibbon, the historian, from whom Mr. Cline drew off six quarts of fluid: my colleague Mr. Morgan, also mentioned to me a case of very great accumulation of water in hydrocele.

*Varies in appearance.*—The fluid also varies in its appearance, although generally yellow, transparent, and saltish to the taste; it sometimes contains a quantity of white flaky matter, produced by chronic inflammation, which I have seen more in the hydrocele of West Indians than in others.

When produced under acute inflammation of the testis, the fluid is sometimes of a red colour, from a mixture of red particles of the blood.

I have also seen in the fluid of hydrocele loose cartilaginous bodies, of which we have a specimen in our collection at St. Thomas's Hospital. When hydrocele has existed a great length of time, the tunica vaginalis becomes thickened like parchment, and consequently opaque. Mr. Warner found a tunica vaginalis ossified. There is also one in that state in the collection at Guy's Hospital; and Mr. Beavers, a pupil of Mr. Hey, of Leeds, gave me an example of one which he removed from the dead body.

#### DIAGNOSIS OF HYDROCELE.

*Differs from diseased testicle.*—Diseased testis is distinguishable from hydrocele by the latter being less heavy. The diseased testis is more flat on the sides than hydrocele, and more solid; pain is also produced by squeezing the testis; the epididymis is often capable of being felt as a distinct tumour; the cord may be traced with facility in the diseased testis; there is great vascularity of the scrotum; pain is felt in the loins generally; there is often the appearance of loss of health in disease of the testicle. A person comes into my room and says, "Sir, I have a disease in my testicle." Looking at him, I am wont to say, if I observe the appearance of good health, "I doubt that, Sir;" and upon examination, usually find it to be hydrocele.

*From hernia.*—From hernia it may be distinguished by the occasional return of the hernial swelling into the abdomen; by the dilatation of hernia in coughing; by hernia descending from the abdomen, and by hydrocele growing from below upwards. Hydrocele and hernia are, however, occasionally combined in the same indi-

vidual, when the hydrocele is placed before the hernia. Hydrocele is sometimes met with below an adhering omental congenital hernia. Fluctuation and transparency are also diagnostic marks of hydrocele.

*From varicocele.*—Hydrocele may be distinguished from varicocele by placing the patient in the recumbent posture, in which varicocele disappears.

*From hæmatocele.*—From hæmatocele it is difficult to distinguish it; but I will state the differences in the two diseases, when speaking of hæmatocele: here it will only be necessary to say, that hæmatocele is generally the result of a blow.

### OF THE CAUSES OF HYDROCELE.

Dropsy generally, and this disease in particular, is often said to arise from increased secretion or diminished absorption, by which the question of its cause is really avoided:—for myself, I believe a diminished absorption is very rarely the cause of true dropsy. We do sometimes observe a leg or an arm swollen from enlargement of the absorbent glands of the groin or axilla, but the swelling is very different to common œdema, being much more solid than dropsy usually is. But dropsical swellings generally are the result of an increased secretion from the arteries. The proofs of this are found in the increased vascularity of the membranous surface producing it, seen in the living or injected in the dead state; also in the changes in the membranes, produced in long-continued dropsies; and in the quickness with which hydrocele succeeds inflammation of the testis and tunica vaginalis. Certainly, however, common hydrocele is rather the result of relaxation of the arteries, in which their mouths pour out more fluid, than it is the effect of inflammation. The absorbent vessels of the spermatic cord are very much larger in hydrocele than on the opposite and undiseased side.

Hydrocele is not unfrequently the effect of inflammation of the testicle, which, as it subsides, leaves the tunica vaginalis filled with serum, of a deeper colour than usual, and often slightly tinged with red particles.

Hydrocele is generally merely a local disease; but is sometimes connected with a general hydropic disposition.

### OF THE NATURAL CURE OF HYDROCELE.

If an hydrocele be suffered to remain and to become of large size; if the patient be under the necessity of labour to obtain subsistence, inflammation of the tunica vaginalis and scrotum will arise from excessive distention. A slough of the scrotum and tunica vaginalis is produced, and, as it separates, the water escapes: a suppurative inflammation succeeds, granulations arise, and the patient in this way receives his cure.



*Case.*—Hydrocele is not always cured by a blow which tears the tunica vaginalis. I once attended a gentleman, who consulted me for an hydrocele; and who, whilst riding in the neighbourhood of Gibraltar, was thrown forward on the pommel of his saddle, and received a severe blow on the scrotum. The hydrocele disappeared, but in six months again formed, and was, he thought, as large as before. I injected it about two years from the accident.

#### OF THE CURE OF HYDROCELE BY ABSORPTION.

*In children.*—This disease is, in young people, very generally curable by absorption. If a child be brought to me with hydrocele, I direct a little calomel and rhubarb occasionally, and order a suspensory bandage, which is to be kept wet with the muriate of ammonia and liquor ammoniæ acetatis, in the proportion of ℥ij. of the former to ℥vj. of the latter. This, after a short time, produces excoriation, and leads to the absorption of the fluid. The tinctura lyttæ may be added, if the fluid does not absorb quickly.

When hydrocele is the result of inflammation of the testis, the same mode of treatment often succeeds in the adult, in promoting absorption of the fluid, viz. giving submuriæ hydrargyri c̄ extract: colocynth: comp: and applying an irritating lotion to the part. These applications have, however, no power over the common hydrocele of the adult, and I have tried continued blistering without benefit.

#### OF TAPPING FOR HYDROCELE.

When the general health forbids an operation, which, although mild, is attended in some constitutions with risk, if a patient's fears prevent him from submitting to a more effectual treatment, or when it is inconvenient to him to undergo any other operation; the water is removed by tapping.

*Instruments.*—The instruments required are a trocar and canula. The canula two inches long, and the eighth of an inch in diameter. A lancet only is sometimes employed; but it is an inconvenient instrument, leading to difficulty in evacuating the whole of the water, and to bleeding into the tunica vaginalis after the operation.

*Mode of operating.*—The mode of performing this operation is as follows: The person is to stand before the surgeon, who grasps the scrotum and swelling with his left hand, and introduces the trocar two thirds of the length of the swelling downwards, and not directly horizontally, but with a slight obliquity upwards. When the canula has entered the tunica vaginalis, the trocar is withdrawn, and the canula is then passed further into the tunica vaginalis, and the water escapes.

The swelling is grasped, that the fore part of the scrotum and tunica vaginalis may be put upon the stretch, when the trocar enters easily.

The trocar should be directed slightly upwards, and then the testicle is not in danger of injury, which it will be if the trocar be entered horizontally; and the canula is further introduced when the trocar is withdrawn, by which a wound of the spermatic cord or testicle will be effectually prevented. When the water has been removed, and the canula is withdrawn, a small piece of adhesive plaster should be laid over the wound, and a suspensory bandage be applied.

*Sometimes succeeds in curing.*—This operation sometimes succeeds in preventing a return of the disease, although very rarely; but to give the patient the best prospect of it, a strong stimulating lotion may be immediately applied.

Exercise sometimes produces inflammation. I have known a person who had been tapped in the morning, get into a coach at night to go to Manchester, and have sufficient inflammation produced to effect a cure.

*Time in which it forms again.*—As in very few cases inflammation succeeds, or a cure is produced by this operation, the patient returns in a few months for its repetition; but the time of recumulation is very uncertain.

If the disease very soon reappear, it is a proof of an hydropic disposition, and it is right to give submuriæ hydrargyri, with squills, at night, and tincture of digitalis spiritus ætheris nitrici and mistura camphorata twice in the day.

*Not devoid of danger.*—This apparently trifling operation is not entirely unattended with danger, as the following case proves:

*Case.*—Mr. Somersett, an aged gentleman, came to town from Wiltshire, to undergo this operation; and on the evening of the day in which it was performed, he took a long walk. On the following day but one there was considerable inflammation in the scrotum, and his son, who was my dresser, advised him to rest and suspend the part. The inflammation, however, proceeded, and in a week he expired; gangrene having been produced in the scrotum to a considerable extent. Well may it be said in our profession, "There are some you must not touch, there are others you cannot kill." Mr. Green, of Lewisham, has published a case of a similar kind, which I had an opportunity of witnessing.

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## LECTURE XVII.

### OF THE OPERATIONS FOR THE CURE OF HYDROCELE.

VARIOUS have been the operations advised and resorted to for the cure of this disease: some very severe, others very uncertain in their issue. The excision of the tunica vaginalis to greater or less extent was practised by surgeons forty or fifty years ago: an

operation which I have seen two or three times performed, but which I hope never to witness again; painful in its performance, and violent in its consequences, beyond what this disease (which is little more than an inconvenience) will warrant. A second operation consisted in passing a tent into an opening in the tunica vaginalis, which produced inflammation, but, from the adhesion being partial, it often did not prevent a return of the disease. Thirdly, caustic was used, potassa fusa was applied to the scrotum, and rubbed upon the part, until its influence reached the tunica vaginalis, destroying its life and texture; this, when well managed, was a very successful operation; but it required great attention in its use, and I have known it, in a diseased constitution destroy life.

*Different operations.*—The operations to which I have occasionally recourse are three: 1st, Injection; 2d, Seton; 3d, Incision. The object of the two former is, to excite adhesive inflammation, and to change the action of the part, so as to prevent further secretion; in the latter, to fill the cavity with granulations.

*Injection.*—For the operation by injection we are indebted to Sir James Earle; and those who are old enough to remember the contrariety of opinion on the treatment of hydrocele; how one surgeon advocated seton, another caustic, a third incision; well know how to appreciate the proposal of Sir James Earle, and must be aware how much our profession and mankind are indebted to him for his suggestion.

*Instruments required.*—The apparatus which is required for this operation is an elastic gum bottle, to contain about six ounces of fluid, fitted with a brass cylinder to receive a stop cock, which can be attached at pleasure. A trocar and a canula two inches long are also required.

*Fluids injected.*—The fluid which is used as an injection is, either equal parts of port wine and water, or sometimes, when a person has been very unirritable, and the operation has failed, two thirds of wine and one third of water, or ℥j. of zinci sulphas to lbj. of water, or one sixth of spir: vini to five sixths of water. Cold water itself succeeds often very well, but I have known it fail.

*Mode of operating.*—The patient is placed in a recumbent posture upon a sofa or chairs, and the surgeon sits by his side; the tumour is lightly grasped by the left hand of the surgeon, and the trocar is thrust in gradually and obliquely. It should enter two thirds of the swelling downwards, and be directed not immediately downwards to the testicle, but a little upwards, so that if it penetrated it would pass more than one third of the swelling downwards. The trocar and canula having entered the tunica vaginalis, the trocar is withdrawn, and in doing this the surgeon not only nips the scrotum, but the tunica vaginalis around the canula, to confine it within the bag; and when the trocar is withdrawn, he pushes the canula to its hilt within the tunic. The water then escapes into a basin provided for the purpose. The surgeon putting the stop cock into the



elastic bottle, introduces the stop cock on the canula, and the contents of the bottle are then thrown into the tunica vaginalis; great care being taken to nip the tunic upon the canula; the bottle is then removed, the stop cock remaining upon the canula. The patient soon feels pain in his groin, next in the spinous process of the ilium, and then in the loins, sometimes the neck of the bladder suffers. The fluid is to be withdrawn at the end of five minutes, and then the operation is completed.

*Time the injection is to be retained.*—Although, as a general rule, five minutes are occupied in the retention of the injection, yet it may be observed, that the suffering is sometimes so considerable, that a surgeon might be tempted to believe that the fluid should be sooner removed; but the succeeding inflammation is not at all commensurate with the previous irritation: those who suffer the most at the time of injecting, have often the least inflammation, and I am, therefore, disposed to continue it the same in all adults. In the young, three minutes will suffice.

*Tunic not to be distended by the injection.*—I never distend the tunica vaginalis with the injection, but throw in less fluid than was removed from the hydrocele, and move it in the tunica vaginalis, so as to make it apply itself to every part of the surface. If much be injected, the cremaster contracts, and forces a part of it by the side of the canula into the cellular membrane of the scrotum.

*Slight enlargement of the testicle.*—If, when I have drawn off the water, I find the testis somewhat enlarged, it does not prevent my proceeding with the operation; for I find the excitement which it produces often diminishes the testis, and does not prevent the success of the operation.<sup>4</sup>

*After-treatment.*—When the operation is concluded, much depends upon the after-treatment to render its issue successful. The suspensory bandage is not to be reapplied, and the rules laid down for the patient are these: If you are in much pain, lie down; if you suffer but little, take exercise; if you be in much pain, eat very little and drink only diluents; if you suffer but little, take your dinner and two or three glasses of wine; come to me to-morrow; if, then, there be redness in the scrotum, considerable tenderness, and some swelling, you direct the suspensory bandage to be worn, the exercise to be moderated, and the diet to be light; but if there be little appearance of inflammation, it is right to grasp the scrotum in one hand, and with the other to gently tap it a few times with the fingers to produce slight pain. Recommend exercise and a generous diet, until redness of the scrotum, swelling, and pain in the part be produced; for the inflammatory swelling from the injection should be nearly as great as that which had previously existed from the disease.

The swelling continues increasing for a week, is stationary for a few days, and then declines, so that in three weeks it has subsided; the operation rarely requires a confinement of more than a few hours; sometimes it does so for a week, but, in general, I say to

my patients, after four days you will be walking about again; and then if they are not confined at all, they are much gratified.

*Operation fails.*—This operation sometimes fails in producing sufficient inflammation to effect a cure. I once asked Sir James Earle if he did not fail sometimes; and he said, scarcely ever; this is quite contrary to my experience; for I sometimes fail, and should very often, but for great care in the after-treatment, upon which, I think, much depends. I sometimes, when water is reproduced a few days after the operation, tap it to remove the serum, and to produce, by this operation, a larger share of inflammation.

*From suppuration.*—I have seen suppuration, after injection, in very irritable persons; and in cases in which the hydrocele has been the result of inflammation, and the inflammation of the tunica vaginalis had not completely subsided. It occasions delay, makes the operation much more painful, and renders confinement necessary, but it makes the cure more certain. A young man, about twenty years of age, come to me in Spring Gardens, with an hydrocele on each side. He resided in Long Lane in the Borough, a distance of two miles from my house. I injected one of the swellings with equal parts of port wine and water, and sent him home. I was sent for to him on account of a high degree of inflammation, which proceeded to suppuration, and which I imputed to suffering him to go to a distance directly after the operation. When he had recovered from this operation, I injected the other at his own house, and directed him to keep his bed, and used the same strength of injection as before, yet this hydrocele suppurated also.

*Case.*—I was once called in consultation a few miles into the country respecting a gentleman, whose hydrocele had been injected in London, and who was suffered to return home afterwards, and the tunica vaginalis suppurated.

When cysts grow between the tunica vaginalis and tunica albuginea, the operation will necessarily occasionally fail.

*Danger of injecting.*—The operation of injection is not entirely without danger, and the danger consists in throwing the injection into the cellular membrane of the scrotum. I have seen many cases in which extensive sloughs were produced, and the following is a case well worthy attention.

*Case.*—A man had been under my care in Guy's Hospital for hydrocele, which I injected, and failed in producing a cure. The man, two years afterwards, was admitted under the care of one of my colleagues. I spoke to the man, and examined him; the case was decidedly hydrocele, in the same side as before. About a fortnight after, as I passed through the same ward, I said to one of the gentlemen by my side, "Mr. Godfrey, where is the man with hydrocele?"—"Sir," said he, "he has quitted the Hospital."—"Indeed," I said, "why?" No answer was made. As I was returning over London Bridge, in my way to the city, Mr. Godfrey joined me, and said, "Sir, I beg your pardon for telling you the man had quitted the Hospital; but the fact is, that he is dead. The dresser

of the surgeon under whose care he was, attempted to inject the hydrocele, by the permission of the surgeon: he threw in the fluid with great difficulty, and only after repeated efforts; the man complained violently, and when the injection was attempted to be withdrawn, it would not escape; in short, it had entered the cellular membrane only; violent inflammation and gangrene ensued, and the man died in a week." This circumstance happened from the canula not being passed into the tunica vaginalis, so that the injection never entered it; and even if the canula has entered the tunic, and is not confined there by pinching the tunica vaginalis around it, it is apt to slip out. This was the reason why I mentioned the care which was necessary to push the canula home, and to pinch the tunica vaginalis round it.

*Mode in which the cure is effected.*—The mode in which the cure is generally effected is, by the effusion of serum and fibrin into the tunica vaginalis; the serum becomes absorbed, and the fibrin glues the sides of the tunic together, and is also at length in a great degree absorbed; but this effusion is not necessary to the cure, which seems, in some cases, to be effected by a change of action in the vessels.

*Case.*—A captain in the coasting trade came to me with hydrocele, which I injected, and cured him. Some years afterwards I attended him with Mr. Holt, surgeon, for a disease of which he died. I requested of Mr. Holt to take away the testicle and tunica vaginalis after death; which he did, and it is now in the collection of St. Thomas's Hospital. The tunic had adhered very partially, it was more relaxed than usual, but did not contain water; so that from change of action, or effusion on the mouths of the vessels, it had ceased to be a secreting surface.

#### OF THE OPERATION BY INCISION.

When some obscurity hangs over the nature of the case as to its being connected with hernia, or some enlargement or disease in the testicle, it is sometimes, though rarely, necessary to open the tunica vaginalis.

*Operation.*—This is done by beginning an incision at the upper part of the swelling, and extending it two thirds downwards; for if it be made to the lower part of the tunica vaginalis, it leaves the testis too much exposed, and produces excessive inflammation in it. The water being evacuated, and the state of the testis learnt, as well as if there be any disease connected with it (as cysts on the testis,) a little common flour is sprinkled in, and thus the surface is forced to granulate, and any return of the disease is sure to be prevented; very seldom, however, is such an operation required; and it ought not to be had recourse to but in cases of great doubt with respect to the disease, as it is one of great severity. After this operation a poultice only should be applied, and the cure is effected by suppuration and granulation.



## OF THE SETON FOR THE CURE OF HYDROCELE.

In cases in which hydrocele will not yield to stimulating lotions, used with a view to produce absorption in very young persons, I prefer to the operation of injection the following plan:

I pass a common curved needle and thread through the hydrocele transversely, about half way from the upper to the lower part of the swelling, including about an inch and a half of integument, and one inch of tunica vaginalis. I then tie the thread with a knot, leaving it loosely hanging in the tunica vaginalis and scrotum. No confinement is necessary; the child runs about as usual, until the part reddens, swells, and becomes hard, which is about a week; and at the end of that time I withdraw the thread, and the adhesive inflammation produces the cure.

I sometimes, in the adult, adopt the same plan when the injection has not produced sufficient inflammation, and it prevents the necessity of any further operation.

## HYDROCELE OF THE SPERMATIC CORD.

This disease is rather of rare occurrence. It may be defined to be an accumulation of fluid in the tunica vaginalis of the spermatic cord.

*How formed.*—The complaint is founded upon the following circumstance: When the testis descends from the abdomen, the spermatic cord is closely invested by peritoneum, which adheres to its vessels; but the portion of peritoneum which descends with the testis from the lower part of the abdomen, does not, at first, adhere to the cord, but a channel, admitting of a probe, is left between the two portions; so that the tunica vaginalis is, at first, open to the abdomen from the testicle upwards. But after a time adhesion is produced of the tunica vaginalis from the place at which the spermatic cord quits the abdomen nearly to the testis, and the two portions appear as one. Sometimes, however, it happens, that in some part of the cord the adhesion is not complete, and then a space is left, in which a slight secretion proceeds, and which, accumulated or increased, produces at this part an hydrocele of the cord.

The swelling, when seated below the abdominal ring, is easily distinguished from others. It is globular, and when grasped and raised, it appears of a slight blue colour; it is very transparent; extremely firm to the feel; is unattended with pain; it rarely acquires any considerable size, and is merely an inconvenience to the patient from the impression it produces in his mind.

*Difficult to distinguish from hernia.*—When this swelling is seated in the spermatic cord above the abdominal ring, it is very difficult to distinguish it from hernia; for it disappears under pres-

sure, is very apparent in the erect, and almost disappears in the recumbent posture; but there is no pain, no gurgling, no interruption to the bowels from the tumour. The disease in this situation feels like a bullet lodged in the cord,—left to itself it increases, and at last emerges at the ring, when its transparency decides its nature.

*Treatment.*—In the treatment of this disease it may be injected, or an incision be made into it, or a seton introduced.

I am of opinion it is best not to inject them; for it is with difficulty done, and the disease is apt to return; this has happened to myself; and the following case, which had been under the care of a very intelligent surgeon, Mr. Pulley, of Bedford, is a proof that it happened to another:

*Case.*—Master —, of Bedford, had a hydrocele of the cord, of six years' duration: it appeared in part above, but the greater part just below the ring; it was very transparent. Mr. Pulley tapped it, and it formed again immediately. Mr. P. has twice injected it—once five years ago, and secondly, two years and a half since, but the disease returned. I cured it by making an incision, and introducing flour, but two abscesses formed during the cure.

A seton made by introducing a common curved needle carrying a single silk, is a more lenient cure.

A hydrocele sometimes, I believe, forms on the cord from a secretion, proceeding into a hernial sac shut at its orifice to the abdomen.

#### ON HÆMATOCELE.

Hæmatocele is a collection of blood in the tunica vaginalis testis. The tumour is pyriform like hydrocele, is not painful, does not affect the general health, and is attended with slight fluctuation, but it is not in the least transparent.

*Distinguished from hydrocele.*—It is distinguishable from hydrocele by its weight being greater, by its want of transparency, by its obscure fluctuation, but most easily by its being usually the sudden result of a blow upon the part.

*Case.*—A man came to my house in the country with a pyriform swelling of the scrotum, which, he said, had been the result of his being thrown in riding upon the pommel of the saddle, and that, at first, the scrotum had been also severely bruised, and was of various colours from extravasated blood. I made an incision into the tunica vaginalis, and discharged a large quantity of brown-coloured fluid blood, and large coagula changed in colour by long retention; I then ordered a poultice, to produce suppuration in the tunica vaginalis.

*Case.*—Mr. W. was brought to my house by Mr. Harris, surgeon, of Gracechurch Street, with a pyriform swelling of the

scrotum, produced by a blow fifteen years before; and it increased progressively to the time at which I saw him. The testis and epididymis could be felt at the lower part of the swelling, and above it to the ring a solid substance, mixed with a fluid, could be perceived; the swelling was not in the least transparent, and he had never suffered pain in it. I opened the swelling at my house, Sept. 23, 1822, and discharged a greenish dark-coloured fluid blood, and solid substance of a slightly yellow colour. The tunica vaginalis was excessively thickened, looking like the densest parchment. He went home in a coach, which was about three miles; and on the same day, when imprudently sitting in his counting house, he was seized with a profuse hæmorrhage from the tunica vaginalis, and fainted: he was carried to bed, and he had violent constitutional irritation, with suppuration of the tunica vaginalis; but he did well.

*Sometimes follows hydrocele.*—Hæmatocele now and then follows tapping in hydrocele, more especially if a lancet be used. Mr. Sherwood, of Reading, informed me, that a hydrocele being tapped, some blood escaped after the canula was withdrawn. The lips of the wound were united, and some time after a fresh hydrocele appeared to be formed, and was to be operated upon by injection; but upon passing the trocar, the tunica vaginalis was found full of blood. An incision was made into the tunica vaginalis, the blood was discharged, and the patient was cured.

*Case.*—Mr. Lewis, surgeon, in Mark Lane, had a patient whom he had twice tapped for hydrocele. About two months after the last operation, he returned with the appearance of a renewed disease, only that the swelling was somewhat rounder. Mr. Lewis again tapped, and drew off a pint of thick bloody fluid. In a fortnight the swelling re-appeared, has never increased, but is gradually absorbing.

*Case.*—Hæmatocele is sometimes founded on hydrocele. A man was brought into Guy's Hospital, who had long had a hydrocele, who had received a severe blow upon it, which suddenly increased the swelling, bruised the scrotum, and produced great pain from distention. I made an incision into it, discharged a large quantity of water, and of coagulated blood, and found a rent in the tunica vaginalis about two inches long, covered with coagulated blood.

*Case.*—Dr. Saunders, formerly teacher of medicine at Guy's Hospital, had a hydrocele, for which he applied occasionally to Mr. Lucas, my colleague at Guy's, to have it tapped. In stepping upon a chair to reach a book, he fell against the back of the chair, and received a blow upon the scrotum, which led to the recurrence, as he thought, of his hydrocele, and in a few days he went to Mr. Lucas to have it tapped, but upon the introduction of the trocar no water passed; the doctor then consulted several surgeons; and at length Mr. Cline made an incision into the part, and the tunica vaginalis was found full of coagulated blood, which was discharged, a poultice applied, and he soon recovered.



*Not always produced by a blow.*—Hæmatocele is not always produced by a blow. I attended, with Mr. Hicks, in Bond street, a gentleman, who had a large pyriform swelling in the left tunica vaginalis, which had never been painful, and which had an obscure fluctuation. I made an incision into the swelling, in the presence of Mr. Hicks, and discharged near a pint of fluid blood. This swelling had not succeeded a blow, but Mr. Hicks imputed it to excessive exertions this gentleman had been in the habit of making.

We have in the collection at St. Thomas's Hospital, a hæmatocele, in which the testicle was removed by mistake. The case assumed the symptoms and feel of a diseased testis, and the surgeon determined upon its removal. I took it to St. Thomas's to dissect, for the surgeon who had removed it had not even the curiosity to examine the disease. When I opened the tunica vaginalis I found it most excessively thickened, and filled with coagulated blood of a brownish red colour. The testicle was placed at the posterior and lower part of the swelling.

## LECTURE XVIII.

### ON THE DISEASES OF THE TESTICLE.

THAT change to which the testicle is sometimes, but not very frequently subject, viz. the formation of a number of cysts or hydatids within its substance, is the disease which I shall first describe.

#### OF THE HYDATID OR ENCYSTED TESTIS.

*Age at which it occurs.*—This change in the testicle is usually observed in the earlier periods of life, generally from eighteen to thirty-five years, although I have seen it occur at forty-nine years. It has been said to begin in an enlargement at the end of the epididymis; but of the part in which it commences I am by no means certain, whether in the testis or in the epididymis; for the enlargement is so gradual and imperceptible, that it is usually discovered by accident. The disease is generally unattended with pain, nor does the patient complain of any tenderness in the part when it is handled. It does not seem to be produced by or attended with any constitutional disease, for the appearance of the person is sometimes that of robust health. There is no redness of the scrotum, but the veins of the spermatic cord are, in some instances, very much distended with blood, so as to be varicose. The form of the swelling is that of the testicle, rounded upon its fore part, and flattened upon its sides, rather than pyriform like hydrocele. The epididymis, under the greatest enlargement, can be distinguished in its swelling from the testis by a line of separation

between them. The disease is attended with obscure fluctuation, but it is rather a yielding at the part compressed with the finger, than an extensive fluctuation from one extremity of the swelling to the other. If the diseased part be firmly compressed, it gives the sensation of squeezing the testis; it gradually increases until it acquires great size, and then its weight becomes very inconvenient, and the disease produces considerable uneasiness in the loins, from the testicle stretching the nerve of the spermatic plexus. On these accounts, viz. the size it acquires, and the pain which its weight produces, the patient becomes anxious for its removal.

I have never seen this disease affect the spermatic cord to the abdomen, or extend its influence beyond the testicle and epididymis.

#### ON THE DISSECTION OF THIS DISEASE.

On cutting into the part after its removal, the tunica vaginalis is found to be a little thicker, and the tunica albuginea is much denser than natural. The testis is in its interior, is filled with numerous cysts of various sizes, some small as the heads of pins, others of the size of peas, and the largest about an inch in diameter: as they vary in size, so the fluid which they contain differs in appearance—the smallest contain a watery fluid, transparent, and without colour; the larger appear to be filled with serum; and the largest, when opened, discharge mucus with some pus, as they have undergone a partial suppuration. I have seen in these cysts a true hydatid contained in the fluid, like that which is frequently found in the liver. The cysts are highly vascular, and their appearance is very beautiful when the serum is seen through a highly vascular cyst. The glandular structure of the testis seems to be in a great measure destroyed. The appearances in the epididymis are of a similar kind, only that the cysts do not acquire the same magnitude.

#### OF THE DIAGNOSIS OF THE HYDATID TESTIS.

*Mistaken for hydrocele.*—This disease is often mistaken for hydrocele; and it must be confessed, that they are with great difficulty distinguished from each other. I do not believe that there is any surgeon, who is candid, and who has had such opportunities as the surgeons of the large hospitals possess of witnessing disease, who will not confess he has mistaken this disease in the testicle for hydrocele, and plunged a lancet into it, and has been surprised to find, that a little water and blood only have followed.

*Marks of distinction.*—The marks of distinction are a less extensive fluctuation, a much heavier swelling, rounded upon the fore part, and flattened upon the sides; the entire absence of transparency; the sensation of the testis being squeezed under pressure; the varicose state of the vessels of the cord and dilated veins of the

scrotum; a division of the swelling into two, viz. testis and epididymis. Testis not felt as in hydrocele.

*Case I.*—Charles Demby, aged forty-nine, was admitted into Guy's Hospital, 23d of May, 1804, with enlargement of the testis. It began two years before in a diminution of the left testis, accompanied by a sense of weakness on the left side; it afterwards gradually became larger than the other: and he applied, three quarters of a year after discovering this increase, to a surgeon of the first talent and respectability in the neighbourhood of London, who introduced a trocar into the testis, and a little water was observed to issue, but the quantity was very small. He immediately pronounced it a case of hydatid testicle: as it still continued to increase, the patient applied for admission into Guy's Hospital. On the 29th of May I removed the testis, and upon cutting into it I found a purulent fluid in some of the cysts, and the appearances which I have described in others. The wound quickly healed, and he was discharged on the 16th of June, having thus early entirely recovered.

*Case II.*—Mr. Davie, surgeon, brought me a testis from a subject in the dissecting-room, in which one of the globular hydatids was lodged. It was enclosed in a distinct cyst, produced by adhesive inflammation; the hydatid itself exactly resembled that which is so frequently met with in cysts of the liver.

*Case III.*—Bartholomew Lupre, aged thirty, an Italian sailor, was admitted into Guy's Hospital in April, 1809, with an enlarged testis, which he reported began four or five months previously; the cause was unknown, but he supposed that it arose from a cold, produced by his wearing wet clothes; the veins of the scrotum were much loaded with blood, and those of the spermatic cord were very varicose. This man suffered considerable pain in his loins from the weight of the swelling. I performed the operation of removing the testicle, and found it, upon dissection, full of cysts of various magnitude.

*Case IV.*—A young medical man called upon me with enlargement of the testis, unattended with pain: its increase was gradual, its weight was considerable, its fluctuation obscure; the general health was good. Mr. Guthrie removed the testis, which I examined, and found to be of the hydatid or encysted kind: he gradually recovered.

*Cause.*—The cause of this disease is unknown, and I shall not indulge in speculation, which would probably be unsatisfactory for want of proof, and useless in preventing the occurrence of the disease, if clearly developed.

The operation for the hydatid disease is required from the inconvenience resulting from its size, and from the pain in the loins produced by its weight. A quantity of blood should be taken from the arm; the patient briskly purged for a few days, and animal food refused for a week before the operation. I have never known



a patient do otherwise than well under the removal of the testicle for this disease.

*No danger of return, if removed.*—You may confidently also assure your patient, that there is no remote danger of returning disease; for in no instance has there, within my knowledge, been any extension of the complaint to the abdomen by the absorbent vessels.

It is right to state, however, that I once saw in Mr. Moorhouse, a medical gentleman who died of a fungous testicle, which extended into the abdomen; in some parts of the testicle numerous hydatid cysts mixed with the morbid fungus or medullary structure; so it seems that the two diseases may be combined in the same individual.

#### OF THE MALIGNANT DISEASES OF THE TESTIS.

The testicle is subject to two diseases of a malignant character: viz. the fungus and the scirrhus disease: of which the former is by far the most frequent.

#### OF THE FUNGUS, MEDULLARY, OR PULPY DISEASE OF THE TESTIS.

Under these various names has this disease been described—fungus, because when it ulcerates, a large fungus projection forms from it; medullary, because it has somewhat the appearance of the brain in a putrid state; pulpy, because it is soft, and easily breaks down to pressure. It has been often also called the soft cancer, on account of some resemblance it bears to cancerous affections, although its texture is of a much softer consistence.

*Symptoms.*—The symptoms of this complaint are as follow: It begins in an enlargement in the body of the testicle, which is, at first, accompanied with great hardness, and the form of the swelling is more globular than that of the testis in its natural state. The epididymis becomes soon affected after the disease has shown itself in the testis; the enlargement proceeds generally rapidly, although, in some cases, it varies in that respect. The pain which attends it, is at first only occasional, and not severe. Slight causes, as a catarrh, or more than usual exertion, increase its size; but by rest, the enlargement subsides nearly to its former state; it soon becomes of the size of a small orange and of its globular shape: it feels very hard, but is free from tenderness when pressed; it at length forms adhesions to the surrounding parts, so that the scrotum, after a time, is only moveable over it at some points. It is, at first, regular on its surface; after a time the cord enlarges above the abdominal ring, and at length it contracts adhesions to the pubis. At first the scrotum is not inflamed, although the vessels are somewhat larger. A gland or glands become enlarged in the groin, unattended with pain after the testis has adhered to the

scrotum, and which gradually increase. An absorbent gland also generally enlarges on the opposite side to that in which the disease begins. The disease extends by absorption into the abdomen, before the testis adheres to the tunica vaginalis and scrotum, and produces a cord which may be traced upon the psoas muscle by deep pressure to the region of the kidney, where it produces, just below the emulgent artery, a tumour, readily felt by pressure, when the abdominal muscles are relaxed by bending the body in the recumbent posture.

*Constitutional affection.*—At first the constitution does not suffer, although the countenance of these persons is generally sallow at the very dawn of the disease, showing that the general health is in some degree defective. There is, sometimes, uneasiness in the loins, and sharp pricking pains in the thighs and legs; and as the disease advances, the leg, thigh, and foot, on the diseased side, become œdematous, and feel weak. For some time before death the patient loses his appetite, and gets but little sleep: he has profuse perspiration; the bowels are generally very irregular, as the tumour on the abdomen increases, though prior to that time they are regular, and there is sometimes an irritability of the bladder, and frequent inclination to make water. The iliac glands are also enlarged above Poupart's ligament.

*Period in which it proves destructive.*—I have known the disease very rapid in its progress, terminating the patient's existence in a few months; but I have also known it two years in one case, five years in another, and fourteen in a third. The fact is, that a simple chronic disease in the testicle will remain stationary for a length of time, if the constitution be tolerably good; but if it become deranged, a malignant action is produced, and the disease assumes the character of the complaint I am describing.\* The

\* This is well illustrated by the following case: James Verrall, æt. 26, employed as a musician at one of the theatres, in the spring of 1823, contracted a gonorrhœa, for the fourth time, which, in three or four weeks, gave rise to an inflammation and enlargement of the testicle; for this he applied evaporating lotions, and kept at rest, and by these means reduced the inflammatory symptoms; but the testicle still remained hard and much larger than in the natural state. He then returned to his usual mode of living, which was very irregular, and in the following October the testicle became farther enlarged, particularly at the posterior part, and it continued gradually to increase in size, until his admission into St. Thomas's Hospital, on April the 8th, 1824. The following is an account of the symptoms and appearances at that time. His countenance sallow, secretions irregular, and much general constitutional derangement, with occasional severe pain in the affected part, extending to the loins. The testicle was about the size of a large orange, somewhat uneven on its surface, feeling extremely hard in some parts, and in others soft and fluctuating. The usual remedies for chronic diseases were employed without producing any alteration in the disease, when, by the advice of my colleagues and myself, he consented to have it excised. This I did for him in the usual way: and on examining the diseased testicle, after its removal, I found the substance of the gland converted into a soft, pulpy, or medullary matter, in the centre of which was a small abscess; the epididymis presented

testis in this disease has often a disposition to ulcerate; the scrotum adheres to the tunica vaginalis, and assumes a livid hue. A sense of fluctuation is produced, so that it might be supposed to contain a fluid; ulceration begins in the scrotum, and through the opening a fungous substance projects, which discharges a very large quantity of a watery fluid; bleedings occasionally ensue from this fungus. If the testicle be pressed, a quantity of matter which looks like putrid brain issues; the fungus sloughs, then the part discharges profusely, bleeds, and again sloughs, until the patient is exhausted by irritation and discharge. Towards the close of life the pain is often excessively severe in the part, in the abdomen it is occasional only; and the patient has vomiting, and frequent attacks of diarrhœa. I have known a person just before death have the following symptoms: vomiting, hiccough, violent pain in the abdomen, swelling of the legs and thighs, tumour in the abdomen, and pain with tenderness on pressure over the abdominal muscles.

#### DISSECTION.

The testicle in these cases varies in its appearance according to the stage of the disease. A secretion of a soft pulpy matter, looking something like brain, is found deposited in the midst of the semeniferous tubes in its early stages; and as the disease advances, and the testicle becomes enlarged, the semeniferous tubes are absorbed, and the peculiar secretion of this disease occupies their natural situation. I have injected several of these diseases, and we have beautiful specimens of them in the collection. The secreted solid substance is very partially vascular; in some parts the vessels are very numerous, in others they do not enter the disease; those which do, are so tender in their coats, that they readily give way to very slight force; when ulcerated the fungus is found very vascular, other parts of the tumour appear broken down, so as to have lost their organization, and resemble cream; portions of the substance are solid like brain, but in separate masses; some have often also a woolly or flocculent appearance.

*The true nature of the disease.*—The true history of the disease appears to consist in the part secreting, not common fibrous or adhesive matter, but a material of much softer consistence scarcely supporting vessels in some parts, whilst in others there is a rapid growth of the blood-vessels: in one case, therefore, it falls readily into disorganization; in another, produces a projecting fungus so soon as ulceration allows the vessels a less limited growth; but more of this hereafter. In some parts we find coagulated blood mixed with the matter effused, and in others small collections of serum.

a hard mass, like scirrhus, and had numerous portions of cartilage deposited in it, and at its upper part was a bunch of hydatids.

After the operation, he had a severe attack of peritonitis, which was subdued by active treatment, and he left the Hospital much improved in health. with the wound quite closed.



*Disease in the spermatic cord.*—In the dissection of the body the spermatic cord is tuberculated with fungous tumours, which contain a soft white pulpy mass; and similar swellings adhere to the peritoneum within the abdomen. A tumour is found on the loins, reaching from thence upwards, behind the intestines, to the kidney. It covers the aorta and vena cava, and the kidney adheres to it: when cut into, there issues from the tumour a considerable quantity of matter which looks like thick cream, mixed with a small quantity of the colouring parts of the blood. The mesenteric glands are enlarged; the liver has tubercles in it: the thoracic duct is sometimes obstructed by a fungus or medullary secretion on it; the duodenum passes over, adheres to the tumour, and is narrowed by it, and the aorta and cava also adhere to it posteriorly. The coats of the aorta and vena cava become diseased.

#### OF THE DIAGNOSIS OF THIS DISEASE.

*Difference from hydrocele.*—This is a difficult task. From hydrocele, the want of transparency; the more globular form of the swelling; the pain which occasionally attends it; its yielding, rather than extensively fluctuating, and the appearance of want of general health, become the means of distinguishing it.

*From hydatid testicle.*—But from the hydatid testicle, when this disease arrives at the pulpy state the distinction is much more difficult, and the most experienced are liable to err. Pain in the part occurring at distant intervals; a sallow complexion, and the appearance of deficient general health are the criteria, but still I have known the best surgeons mistaken. I really am decidedly of opinion, that in hydrocele, hydatid, or fungus testis, no objection exists to introducing a lancet to discover the real nature of the disease. If it be hydrocele, the rush of water directly proves its nature. If it be the hydatid swelling, a little water, mucus, and blood escape; and if medullary, blood only; sometimes a little brain-like substance appears upon the lancet, which immediately informs the surgeon of the true form of the complaint. It does no mischief in the cases which it cannot relieve, and without it the surgeon's reputation is endangered, if he gives a rash opinion upon the nature of the disease.

#### OF THE CAUSE OF THIS DISEASE.

*Deranged state of constitution.*—This disease arises from a defective state of the constitution: it generally occurs in persons naturally feeble, and in those who are irritable, both in body and mind. They are subject to slight feverish attacks, to irregular secretions, to defective digestion; the former producing new and disordered actions; the latter leading to an unhealthy state of blood, in which the quantity of serum is large, and the fibrous part of the blood small in quantity, and loose in texture. But independent of the state of

constitution, there is also an altered local action: if the parts inflamed from this disease are cut into, a fungous structure will be produced from the wound; but if the contaminated parts are entirely removed, the wound heals as any other wound in the body without any such morbid appearance.

#### OF THE TREATMENT OF THIS DISEASE.

*Medicines of no service.*—No medicine has been yet discovered which has any influence over this disease, when it has been once formed. The common remedies used for the preservation of the general health may, by improving the constitution, lessen or prevent the tendency to the disease; but no medicine has any influence upon it when the local disease has once appeared. The pil: hydr: sub muriatis composita given at night, and infus: cascariillæ, soda, rhubarb, and ammonia, given bis die, or hyd. c. creta, soda, and rhubarb, are the best medicines to improve the constitution; yet we ought to look further, to try to discover, amidst the numerous new articles which chemistry and the extension of botanical knowledge have given, if some specific remedy cannot be discovered for this disease. The local remedies hitherto employed have been equally inefficacious. Leeches and evaporating lotions, upon general principles, retard the progress of the disease, but nothing has any specific power in changing the action of the part; when ulcerated, solutions of alum, of sulphate of zinc and of copper, and diluted nitric and sulphuric acid are of some use. All, then, that is left to the surgeon is to improve the constitution first, next to effect the removal of the disease by the knife; and when this has been done, to give such medicines, and rules of living, as shall, by improving and preserving the health, change the constitution, and lessen the disposition to the return of this disease.

*Operation uncertain.*—The removal of this disease by operation is very often unsuccessful, as the disease is very apt to return in the part, or in some distant organ of the body, if a constitutional treatment is not previously and even afterwards pursued. I removed, in a patient of Mr. Sterry, in Bermondsey, a fungous ulcer from the shoulder, and the disease soon afterwards showed itself in the eye, of which the patient died. I removed, in a Mr. Bernard, an eye affected with this disease, and in less than twelve months the disease reappeared in a very large swelling above the groin. In the removal of this disease in the testicle, the complaint frequently returns in the loins and in the spermatic cord. It is quite necessary that the operation should be performed in an early stage of the disease. If, therefore, a patient applies with this disease, and I put him under a course of mercury, and treat him as I shall directly describe I do a simple chronic inflammation of the testicle, and if it do not yield, I advise its removal; for if the spermatic cord in the least participates in the disease, the operation does not succeed: so soon as the wound be healed, and sooner if

the wound be slow to heal, I give constitutional remedies to improve the general health, and to lessen the disposition to a return of the disease.

#### OF THE TRUE SCIRRHUS OF THE TESTICLE.

*A very rare disease.*—This is an extremely rare disease; that which I have previously described being the most frequent;—indeed, for a length of time I doubted if the testicle was subject to the disease to which the breast is so prone; viz. the scirrhus, which, in its progress, produces cancer.

I have seen few examples of that hard swelling in the testis which resembles scirrhus, and I have never seen but one instance in which that hardened testis ulcerated and destroyed the part, resembling in its progress the cancerous ulcer of the breast. Old persons are most liable to this disease; in the few examples in which I thought the disease might be scirrhus, the age has been between fifty and seventy years.

*Symptoms.*—The symptoms have been, a slow increase of the testicle, a hardness which rendered the part almost impenetrable to pressure, occasional severe pain in the part extending towards the loins, the disease beginning in the testis; at length extending to the epididymis; extremely slow in its progress; the surface of the testicle feeling tuberculated, irregular, knotted, and excessively hard; the spermatic cord becoming gradually thickened; the body bent forward, or the thigh advanced; the leg and thigh, upon the affected side, swollen and œdematous; some water effused into the tunica vaginalis, so that the testis is felt through an hydrocele, a tumour at last forms in the loins, but never acquires the magnitude of that in the medullary disease, nor does the testis become so large in scirrhus as in the complaint before described. The patient sinks from impaired digestion, violent pain in the abdomen, and irregular state of bowels.

#### DISSECTION.

When the testicle is cut open, the tunica vaginalis and tunica albuginea are thickened; and, instead of the tubes which form the secreting structure of the testicle, a hard white mass is found, in lobes or tubercles, which are harder than the other parts, and in which cartilaginous and sometimes ossific matter are deposited. The epididymis has the same appearance, and some tubercles are found in the cord.

#### SCIRRHUS TESTIS.

*Case.*—Thomas Cheston, aged 44, who had resided at Tottenham, was admitted into Guy's Hospital, for an enlarged and hardened testis. The testis, when first enlarged, was impenetrably



hard; water formed around it, and the hardened mass was felt through the surrounding water, which being drawn off, was found to amount to four ounces. His disease began in June 1808, and he says, he first observed a pain in the loins, and, a month afterwards, hardness and uneasiness in the testicle: it gradually increased, but never became very large. The testicle and epididymis, when he came to the Hospital, were both affected, but the spermatic cord was not enlarged. He had much pain in his loins, more especially in stooping. His countenance became then sallow; his digestion impaired; his leg and thigh (but first the latter) became enlarged and œdematous. He had been a strong muscular man, and thought he was in good health when the disease began. The testis was removed in March 1809, and the wound slowly healed. He was discharged the Hospital as soon as the wound was closed; but the swelling in the thigh and leg remained, and he died a month after his return to Tottenham.

On examination of the testicle, after its removal, it was found hard, white, very compact, tuberculated, and in a few spots very vascular. The epididymis was also enlarged. We have, in the collection of St. Thomas's Hospital, three or four preparations of this disease, in which the appearances of the testis are as above described. The substance is white, very hard, tuberculated, cartilaginous matter in one part; some ossific matter in others.

The disease does not increase, either in the part or in the abdomen, to the same magnitude as the fungous disease.

*Disease of the cord.*—This disease requires the operation for its removal: but if the cord be affected, I have not known the operation succeed; and, indeed, there is some danger to life in its performance.

*Case.*—In visiting the wards of Guy's Hospital, I saw a man who had a testicle very hard and considerably enlarged, and the cord of at least three times its natural size. I said to the students, "It will be of no use to operate in this case, for the disease has extended beyond the reach of the knife." One of the students, who thought himself wiser than the rest of the world, told the man, if he would place himself under his care, he would take a lodging for him, and remove the part. The man consented, and this young man removed the testicle, tracing the cord, as I was informed, very much towards the abdomen. Peritoneal inflammation succeeded, and the man died in a few days, prematurely for the patient, usefully probably for the rest of life to this foolish and presumptuous student.

*Constitutional treatment.*—This disease will require the same constitutional treatment as that which I before described, after the operation has been performed, to prevent the return of the complaint.

## LECTURE XIX.

## OF THE SIMPLE CHRONIC ENLARGEMENT OF THE TESTIS.

THIS is an extremely frequent disease, and one which has been mistaken for a malignant complaint of the part.

*Commencement of the disease.*—This disease begins in hardness and swelling of the epididymis, at first unattended with pain. It gradually increases, without pain, until the testicle becomes involved in the disease; the testis is quite smooth; the epididymis may be traced separately from the testis, the line of separation being more distinct than in the natural state. The patient's health appears generally but little affected, and the part is so indolent, that the patient handles it with a degree of roughness, which surprises the surgeon. Both testicles not unfrequently become affected at the same time; and sometimes, when the enlargement is subdued in the one, the other becomes diseased in a similar manner. The surface of the testicles and epididymis remain quite smooth, even under great increase of the part.

*Its further progress.*—In the state which I have described the testicle remains for weeks, and sometimes for months; and then under severe catarrh or violent exercise, especially on horseback, it becomes very painful, with uneasiness of the loins and redness of the scrotum, which will be relieved by the means which are to be hereafter described; but soon the symptoms return, and at length a suppurative inflammation ensues, which usually happens at the extremity of the epididymis: a sinus follows, which discharges seminal fluid, stiffening the linen as semen is wont to do. From this sinus granulations spring and produce an exuberant growth, forming a prominent granular swelling upon the scrotum. This still continues for an indefinite time, unless something be done by surgery for its relief.

## DISSECTION.

Before this disease was understood, I have several times known the testicle removed for it, and the appearances upon dissection I have preserved in the collection.

*Adhesive stage.*—In the adhesive stage, an uniform yellowish-white adhesive matter loads the tissue of the part; the semeniferous tubes remain, but are separated by the effusion which I have described.

*Suppurative stage.*—In the suppurative stage, upon cutting into the epididymis, and sometimes into the body of the testicle itself, a small abscess is found, containing pus, mixed with adhesive or fibrous matter; and this state of the testicle will sometimes render

its removal necessary. When it forms a granular swelling, it is found, upon dissection, that a small opening is formed in the covering of the epididymis, through which the granulations spring and expand; and sometimes the testicle itself forms the granulation from the abscess which it contains, and which passes through an opening in the tunica albuginea. These abscesses will sometimes, after discharging for months and even for years, absorb the testicle, and leave the patient with little more than the tunica vaginalis and tunica albuginea remaining, and if both testes have been affected, impotence is the result.

#### OF THE CAUSE OF THE SIMPLE CHRONIC DISEASE.

*Morbid state of the Urethra.*—This complaint is often depending for its production upon a morbid state of the urethra, which produces a sympathetic influence upon the testicle. Sometimes it is simple irritation only of the urethra which produces it; sometimes a stricture in the membranous part; now and then an irritation in the prostate gland, or in the prostatic part of the urethra. But still it is wrong to view it as having merely a local origin; for there is, in most of these cases, a state of constitution which predisposes it, and without constitutional alterative means you will not succeed in curing it. I have often seen this disease follow syphilis; frequently observed it accompanied with an eruption, which many would conceive of a syphilitic character; often known it to follow a mercurial course in delicate persons, who have, during the time, been exposed to vicissitudes of temperature, and to catching cold from being frequently wet in inclement weather.

#### OF THE TREATMENT OF THIS CHRONIC INFLAMMATION.

This complaint, for which the testicle is frequently removed, under a mistaken idea of its malignant tendency, generally yields to the treatment which I shall now advise you to adopt.

When you are consulted respecting the complaint in its adhesive stage, you will say to your patient, "Now, if you choose to be cured, there is no difficulty in effecting it; but I fear you will not submit."—"Oh," he says, "I will submit to any thing to prevent the loss of my testicle." Well, the plan then is as follows:

*Position.*—1st. Observe the recumbent posture for a month. It is not sitting with your legs raised which will suffice, but to be absolutely recumbent is necessary.

*Medicine.*—2d. Take two or three grains of submurias hydrargyri and a grain of opium night and morning, until the mouth be sore; and then such a quantity as shall preserve that tenderness of the gums for a month.

*Local bleeding.*—3d. Apply leeches twice in the week, or let the patient stand before his surgeon and have the veins of the scrotum opened by a lancet.



*Applications.*—4th. Apply upon the scrotum equal parts of camphorated mixture and vinegar.

5th. About every fourth morning give an active dose of infusion of senna, with sulphate of magnesia and tincture of senna.

*Period required for the cure.*—In about three weeks, in this way, you will reduce the size of the part; and then, if the urethra has been diseased and the complaint be sympathetic, you may introduce daily a silver sound, to remove any obstruction in the urethra, whilst the patient is still recumbent and living low; when the disease will, at the end of the month, or of five weeks, be cured.

In the practice which I have had an opportunity of witnessing, it will be readily supposed I have seen a great number of such cases, and I can therefore speak with confidence of the result of the above treatment; but the following is an excellent example.

*Case.*—An officer of the British army, of considerable rank, some years ago, was seized with inflammation in his testicle, for which he applied to a surgeon; who, after various attempts to reduce it, told him that it was a malignant disease, and that it must be removed. He submitted to the operation and quickly recovered. Some months afterwards the remaining testicle began to swell, and the symptoms were so exactly similar to those of the former disease, that he became excessively alarmed, and placed himself under the care of Mr. Rose, who requested a consultation with Sir Everard Home and myself. We found the testicle hard, swollen, and but little painful: his general health had suffered from a warm climate and exertions disproportioned to his strength. He was put upon the plan which I have recommended above, and in a very few weeks was perfectly well.

A fair inference may therefore be drawn, that the testicle which had been removed might have been saved.

Many testicles condemned for removal I have thus known preserved.

*Sometimes requires removal.*—When the disease has proceeded so far as to produce an abscess in the testicle, it will sometimes require to be removed.

*Case.*—One of our students, who afterwards became a surgeon in the cavalry, had an inflammation and chronic enlargement of the testicle, which had been repeatedly relieved by means similar to those which I have recommended: yet each time he returned to exertion, the inflammation and swelling were reproduced: tired by repeated disappointments, and unable to pursue his profession as he wished, he begged me to remove the part, which I did: and upon examination of it, after the operation, I found a chronic abscess in its centre.

*Granular swelling.*—When the abscess is followed by a large swelling, produced by an exuberant growth of granulations (a granular swelling,) the treatment which is to be pursued is to be as follows:

*Treatment.*—1st. Try pressure with adhesive plasters; and if this does not succeed,

*Caustic.*—2dly. Sprinkle the surface with powdered sulphate of copper, or nitrate of silver, which gradually reduces it. I once knew arsenic applied freely upon the granulations, and it destroyed life.

*Removal.*—3dly. It may be removed by excision. An elliptical incision is made into the skin on each side of the projecting granulations, and then the knife is to be carried horizontally under the root of the swelling, where it projects from the opening in the tunica albuginea; and thus it is removed. The edges of the skin are then brought together by suture, and healed.

4thly. But when the epididymis and testicle are much involved in the disease, and there is much loss of substance in the scrotum, it is necessary to remove the testicle.

#### OF THE IRRITABLE TESTIS.

*Symptoms.*—This disease is known by the following symptoms:—the patient has an uneasy sensation in a part of the testicle; it is tender to pressure, tender also in exercise, and unusually sensitive at all times. The sensibility of the part becomes occasionally so much increased, that the slightest touch is exquisitely painful; pain is felt in the back and groin; the motion of the part and slight pressure of the clothes in walking produce so much pain as to almost forbid exercise, and the patient finds no comfort but by reposing continually upon a sofa, or by remaining in bed. The testicle is little swollen, and the whole of the part is not equally tender. The spermatic cord sometimes partakes of this exquisite sensibility. If the part be not supported, the pain is scarcely tolerable. The patient is obliged to place himself in bed upon the opposite side to the disease, or he does not rest. He has pain in the thigh on the same side,—the testis appears full and loaded. Motion in most cases produces not only pain at the time, but additional uneasiness afterwards. The stomach is rendered extremely irritable, and vomiting is sometimes produced.

The disease frequently continues many weeks, sometimes exists for months, and with others endures for years. When the patient thinks himself much better, a little more exercise than usual renews all the symptoms.

The complaint produces, in some instances, so much distress of mind, so high a degree of bodily suffering, and so completely incapacitates the sufferer from amusement, and the pursuit of a profession or business, that he seeks relief from an operation, which I was thrice compelled by the patients to perform, rather than recommended it upon my own judgment.

The following is a statement by a medical man of the symptoms of the disease, which rendered his life burthensome to him.

*Case I.*—"I think I can trace back the origin of my complaint  
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to the spring of 1817, about eight or nine months before I married. I lived too well: got very corpulent and bloated, and had excessive venereal excitement, which I did not gratify, and felt the testicles and vessels of the cord ready to burst; but when I rose and walked the uneasy sensations subsided.

"Soon after I married I began to feel the uneasiness in the testicle I have since suffered from. I felt pain in coitu so great, as to lead me to go to London for advice. The testis is a little fuller; extremely tender to the slightest touch of the fingers: coitus always irritates it, so that the swelling and tenderness increase from it: the soreness is felt in the upper and outer part of the testis, and in the vessels of the cord. With regard to the nature of the disease, I have been a long time convinced it is seated in the nerves of the spermatic cord; the pain is a benumbed sensation,—at some times, a pricking feel;—at others, such as would proceed from a compressed or irritated nerve. It is uniformly increased by whatever disturbs the position of the testis, or presses upon the ring, or course of the cord. I can bear the erect position for a few minutes, provided the part be properly adjusted. When I lie on the left side, the pain is of a dragging kind, and feels as if it extended from the region of the cœcum; and when on the right it is more sharp, and feels as if the parts, which are tender, were pressed upon by those in the neighbourhood: I feel most easy on my back. There is considerable fullness on the side of the pubes, which is always increased, and extends higher in the direction of the cord, when the pain in the testis has been greater than usual.

"After aperient medicine has produced two or three motions, I usually suffer more pain for a day, and the passage of flatus through the cœcum produces the same effect.

"The cord appears, as far as its tender state will bear examination, to be free from organic change; and the testis, excepting that it is occasionally full, seems unchanged in size or structure.

"My general health is good, and every other function is natural;—yet I have now been confined to a horizontal posture for a year.

"It has always happened, that however severe the pain has been on the side and right limb, or region, it has given way to cold applied to the abdominal ring: and comparative if not perfect ease has been enjoyed for an hour afterwards.

"The means which I before used, but most ineffectually, as to my cure, have been leeches; a solution of nitre, in a bladder, to the part; belladonna and the cold hip bath; sea bathing; regular aperient medicines, and all the means, which the best advice in this country could suggest.

"I consider my symptoms might have originated in an injury I received upon the cord, some time before the symptoms began."

*Case II.*—Master II. aged 14, has a teasing and aching pain in the testis. Exertion brings on the pain; leaning forward increases it. He cannot walk one hundred yards but he has pain in the



groins, loins, thigh, and leg, to the foot, on that side; the testicle is tender to the touch. The recumbent posture relieves him, unless he has catarrh, and then he has the pain even in bed.

#### DISSECTION.

I have removed the morbid part in three instances; and I thought, in the first case, the centre of the epididymis was diminished, and that the disease might be produced by an accumulation of semen behind it, and that the obstruction might produce the pain; but I am inclined to believe that the disease is in the nerve, as in the other two cases there was no marked disorganization.

It seems to me to be a species of *tic douloureux*, supported by the constant functional changes to which the part is liable; for if it arose from organic change, it would not, as it does, cease for a considerable time, and then relapse.

#### OF THE TREATMENT OF THIS DISEASE.

*Medicines.*—The remedies I have seen most useful have been small doses of the *oxymurias hydrargyri* with the compound decoction of *sarsaparilla*, given twice per diem, and continued for a length of time. The application of a *belladonna* plaster to the part, and opening a blister at the groin, and dressing it with *ung: cetacei et opii*. A sea voyage to a warm climate, I have known improve the patient, from the rest and change of constitution it has produced. It will be right to try arsenic, which has considerable power over *tic douloureux*; to give quinine, as bark relieves it; also to try steel, as it has been recommended by Mr. Hutchinson, of Southall, but at the same time to deplete the part by leeches, and lessen the nervous irritation by the application of a solution of nitrate of potash and muriate of ammonia, in a bladder. *Bougies* do not relieve it: but the *ung: lyttæ*, used to produce a slight discharge from the beginning of the urethra, I have known of service.

The following are the three cases in which I have operated for the removal of the testis on account of this affection.

*Case I.*—Mr. G—— contracted a gonorrhœa at Paris, in October 1815, and in consequence had inflammation of the right testicle, for which he applied fomentations and took aperient medicines: the testicle continued swelled and painful until June 1816, when the employment of strengthening plasters removed all inconvenience; a slight degree of pain returned at intervals until June 1817, when he was again relieved by plasters, and thought himself sufficiently well to join his regiment. The exercise which his duty obliged him to take, soon occasioned so much pain, that during the winter of 1817 and spring of 1818, he scarcely had a moment's respite, but only used a blister, which he thought increased the tenderness. In May 1818 he returned to England,

and bathed in the sea till September, at which time the pain was nearly removed, but he was unable to walk or ride. Since he has not employed any remedy but nine weeks' sea-bathing at Brighton, which produced no amelioration: he was unable to walk ten yards without experiencing considerable pain; the only thing which appeared to relieve him was violent motion in a rough carriage.

On account of the continued pain, confinement, consequent depression of spirits, and loss of health, he determined on having the testicle extracted, which I removed on the 1st of March, 1819. The wound healed slowly, and one or two small abscesses formed in the scrotum, but he ultimately did extremely well.

*Case II.*—Captain P. had an irritable state of the left testis, which commenced in March, 1818. The vein of the spermatic cord felt distended; the part was exquisitely tender to the touch, and exercise produced pain, which was intolerable if the part was not supported: he could not rest on the left side, or bear the slightest pressure on the testis; he had increased pain in coitu, and after it the part felt full and loaded. He was somewhat, but only for a time, relieved by the hot bath, or fomentations. He tried blistering at five different times: applied two hundred leeches, at separate times to the affected part: employed also various lotions, opium, and belladonna, with every medicine which seemed likely to be useful in lessening the irritability; but all without benefit.

I removed the testicle for him in 1823: he quickly recovered from the operation, and felt very grateful for his restoration to society.

*Case III.*—This case is drawn up by the gentleman himself, who came from America to consult me; he also saw Mr. Abernethy and Mr. Pearson. Having tried every variety of medicine and local treatment without advantage, and determined not to return to America with the disease, at his request I removed the part, and have since heard that he remains perfectly well. He says:

"For several years past my left testicle has been larger than my right; at times considerably so, especially when I have taken cold. Early last summer I began to be uneasy about it, but neglected to take advice. In August I lost two children by the yellow fever, and in my anxiety I exposed myself to unusual fatigue; and in a few days after their death, the last week in August, I had for the first time pain in the left thigh and groin, also in the testicle, which was much enlarged. I then applied to one of our best surgeons, who made an incision into it, and let out a large quantity of water; this was about the 10th of September: he then desired me to suspend it, as I do now, and to use a lotion of the extract of lead and opium. In a few days after the part again became painful, for which I applied tepid poultices of bread and milk, and bathed it in warm water. The pain continued, and in about six weeks after, the operation was repeated; but very little water was drawn off: no injection was used. For some time previous, and

for about six weeks after the second incision, I took mercurial pills, two or three each day, and occasionally used mercurial friction on the thigh and testicle, keeping up a soreness in the mouth, but not producing much salivation. With some intermissions this course was continued for about four months: I laid in an horizontal position, except occasionally for a few minutes at a time, and drank only toast and water; lately I have taken Madeira and water, or one or two glasses of Madeira, at dinner. In December, a blister was applied to the scrotum, which produced a copious discharge. I think all these remedies gradually reduced the size of the testicle; but the pain continued; sometimes a sharp shooting pain in the groin; but generally a heavy, dull, constant pain.

"In March I procured some leeches from New York, and applied seven; bathing with tepid water, by which I got away a considerable quantity of blood, producing great debility. In April I again applied three leeches; since which I used the lotion of lead and opium.

"At present the part is about the same size as it has been for two months past; but the pain is constant, and I cannot stand for ten minutes without increasing it considerably: there is great sensibility in the part; the slightest touch is painful.

"My general health is as good as it has been for years past; I am subject to headache, and other dyspeptic symptoms: a long residence in warm climates has injured my constitution."

#### OPERATION OF CASTRATION.

I shall conclude this Lecture with describing to you the operation of castration. The patient being placed upon his back, upon a table of convenient height, with his legs hanging over its end; and the hair of the pubis being removed, the surgeon begins his incision at the upper part of the abdominal ring and extends it to the bottom of the scrotum. The lower part of the scrotum should be divided, or a bag of matter afterwards forms in it. The next incision is made upon the spermatic cord, just below the abdominal ring, so as to lay it distinctly bare, and to enable the surgeon to raise it. In this second incision the external pudendal artery is divided, and affords a bleeding, which leads the surgeon to request it may be compressed by an assistant, until the testis be removed. The next step of the operation consists in raising the spermatic cord, and in passing a curved needle, armed with a ligature, nearly through its centre, just below the abdominal ring; the ligature is then to be held by an assistant, which prevents the retraction of the cord into the ring, by the contraction of the cremaster muscle. The cord is then completely divided, and the surgeon drawing by it the testicle towards him, separates the cellular tissue between it and the scrotum, and thus detaches it from the surrounding parts.



Sometimes, from inflammation, the testicle adheres to the scrotum, in which case it is best to remove a portion of the latter, rather than to make a tedious and painful dissection in separating these parts. When the testicle is removed, the spermatic artery is sought for in the interior part of the cord, and, when found, is to be secured by a ligature; next, an artery which accompanies the vas deferens, is in like manner to be tied, taking care to exclude the vas deferens from the ligature; after this, the thread which had been passed through the cord, to prevent its retraction, is withdrawn. Any vessels in the scrotum which bleed must be taken up. The coagulated blood is then removed from the scrotum, and two sutures are put into it to bring the edges of the wound together; one just over the end of the cord, and the other midway between it and the bottom of the incision; lint is to be laid over the wound, and it is best at first not to apply any plaster.\* The part is to be supported by a handkerchief, or T bandage.

The ligatures separate in about eight days, and in three weeks the wound will probably be healed. The cruel practice of tying the whole cord with a broad ligature is now properly abandoned by every good surgeon.

## LECTURE XX.

### ON DISEASES OF THE BREAST.

THE diseases of this organ have been too much considered as being of a malignant nature; and females, who have had the misfortune to have tumours in their bosoms, have been often very unnecessarily submitted to an operation, under the idea of the complaint being cancerous. I shall therefore proceed to state what I have been able to learn of the various diseases of this organ, to discriminate the malignant from the more benign complaints, and to point the cases which really require removal, in distinction from those in which operations are entirely unnecessary.

#### OF THE HYDATID OR ENCYSTED TUMOUR.

*Symptoms.*—This disease begins in a swelling, which is unat-

\* From the loose texture of the scrotum, and from the large quantity of cellular tissue, the small vessels are liable to escape the notice of the surgeon immediately after the operation, by their retracting. I always allow the patient to become warm in bed before the dressing is completed, at which period the scrotum becomes relaxed, and I have seen a free hæmorrhage occur at this time, obliging the surgeon to remove the dressing, in order to secure the bleeding vessels. If no further bleeding, however, takes place when the patient has become warm, the wound is dressed with some mild plaster, and the parts well supported.—T.

tended with pain, and which has the character rather of a chronic inflammation, in a part of the breast, than as bearing a resemblance to a scirrhus tubercle; for it has neither its mobility, its excessive hardness, nor its general circumscribed or distinct limits, but it incorporates itself with the surrounding parts of the breast.

The skin over the mammary gland is undiscoloured and the part is scarcely tender to pressure. The general health is unaltered, even when the swelling becomes of the most formidable magnitude.

*Becomes in part fluid.*—As it increases, a change in the nature of the swelling is produced: at first it was uniformly solid, but is afterwards distinctly divided into a solid and a fluid part; the latter fluctuating, so as at once to inform the surgeon of the existence of a fluid. If this part be punctured, a liquid, having the usual character of serum is discharged; the cyst sinks, but soon becomes again distended, and the swelling continues to grow. At length the tumour acquires enormous magnitude, and some of the largest swellings in this organ are of the hydatid kind. I have twice seen swellings not of this description, rather larger than the hydatid; but generally the largest in the breast are of this kind.

One, which I removed, with Mr. Cline, from Lady Hewett, weighed nine pounds.

From Mrs. King, at Charing Cross, I removed one which weighed thirteen pounds; but frequently they are removed when still small, under a supposition that they are scirrhus tubercles.

These swellings are pendulous, and the whole breast is very moveable even when large; they are generally unattended with pain, although to this rule there are exceptions, and the constitution is but little disordered. The absorbent glands, in the most aggravated form of this complaint, are undiseased, so that it does not extend by absorption.

*Inflammation of the cysts.*—Inflammation sometimes takes place in one of the cysts; and, when the cyst ulcerates, serum mixed with mucus, and occasionally with a little matter, is discharged; the wound then heals, and the cavity seems obliterated; but the disease again ulcerates in other parts, and passes through the same process.

It is a complaint I have seen at all ages after twenty, but more frequently in advanced age than in youth.

#### DISSECTION.

Upon dissection, the breast is found to be consolidated by the adhesive inflammation, so as to form a very firm swelling in some parts, but in others it contains cysts distended with serum. The cysts vary in size; some of them contain mucus, mixed with pus. The cysts which I have seen in the breasts have been of three kinds. First, the globular hydatid, like that which is found in the liver, contained within a vascular cyst. A second species com-

posed of numerous membranes, which may be peeled from each other, like the concentric lamellæ of the crystalline humour. But tumours of the breast are sometimes composed of simple bags, which contain and secrete the serum, or watery fluid, within them.

*Case I.*—Mrs. King, of Charing Cross, aged 58, had an enormous enlargement of her left breast; she discovered it fourteen years ago, and supposed it arose from a blow. When first observed it was as large as a marble only, hard, and entirely unattended with pain.

It seemed to be buried in the breast, and was not very moveable in the glandular structure.

It gradually grew until two years ago, when it had acquired the size of a melon. At that period it seemed suddenly to grow faster than before; but was still unattended with pain, and her general health appeared to be good.

Last Christmas it also acquired a very sudden increase; but was still free from any painful sensations, excepting that sometimes, when she had a cold, she felt a slight uneasiness in the part.

On the 30th of September 1822, I was consulted; the tumour then measured thirty-five inches in circumference, was solid, and felt cartilaginous in some parts; but in others was soft and fluctuating, and one bag evidently contained a large quantity of fluid. The solid tumour was placed above, the fluid occupied the lower part of the swelling. Her general health was good, and the swelling was free from pain; but she suffered much from its weight drawing down the skin and pectoral muscle, and putting the nerves exceedingly on the stretch.

On the following day, it was removed in the presence of Mr. Key, surgeon of Guy's Hospital, and Mr. Laviss, a practitioner in Westminster.

The large vessels, divided in the operation, were immediately secured, or pressed upon, so as to prevent any considerable loss of blood.

The wound when dressed on the seventh day appeared healthy; her constitution suffered but little, and she recovered without any untoward circumstance, and is now living at the same residence.

Upon inspection, the greater part of the swelling appeared like boiled udder; within which, at various parts, cysts were contained, and when these were opened, hydatids, composed of numerous lamellæ, were found: serum was effused around them.

*Case II.*—June 1818.—Lady Hewett, aged 60, tall and of strong constitution, dates the origin of the swelling in her breast from a blow she received, November 1815, in her axilla, by falling against a chair; although she had previously felt some evanescent pains in her right bosom. Nine weeks after the blow she felt uneasiness in the right breast, which extended into the axilla. In the beginning of 1816 she discovered a swelling in her right breast, which was about the size of a nutmeg, situated below the nipple. In May 1816 it had acquired the size of a melon, and she con-



sulted Dr. Sharp, of Thrapston, who ordered her what medicines he thought most appropriate to her situation, and sent her to Harrowgate; but, as the swelling increased, she applied leeches every day for two months, and afterwards every other day, till September, without advantage.

She then determined to try the influence of pressure, which she continued several months, by adhesive plaster, and afterwards by an instrument, contrived for the purpose, which was worn during four months, but without any advantage, as the swelling still continued to increase.

She therefore determined to leave the case to nature, and she did so until November, 1817, when the swelling began to undergo a change. It increased quickly, and became soft at its upper part, appearing inclined to suppurate:—fomentations and poultices were applied, calomel and opium given, but matter did not form. This treatment was continued until the May following, when she discontinued all the means.

In June, 1818, she made up her mind to submit to an operation, which I performed on the 10th day of June, 1818, in the presence of Mr. Cline, Mr. Lowdell, and my nephew, Mr. Bransby Cooper.

The swelling was of great size, weighing nine pounds. It was in part solid, in some parts evidently contained a fluid, and over the fluid part there was a slight blue tint. The swelling was very moveable, and reached down upon the upper part of the abdomen. Lady H.'s general health was good. The first steps of the operation consisted in making a puncture into the tumour, at its most prominent part, and discharging a quantity of serum from it, by which it was at once clear the disease was of the hydatid kind, and the magnitude of the swelling was lessened. An incision was then made across the tumour, a little above its middle, and the flap of integument being raised, the upper part of the swelling was detached from the pectoral muscle; and with the handle of the knife the swelling was further separated, and a flap of skin being left below to meet that at the upper part, the operation was thus concluded. The removal was borne with great fortitude. Two arteries, of considerable size, required to be secured. The integuments were brought together by a single suture, and by adhesive plaster. On the 16th of June the wound was first dressed, and on the 30th Lady H. was quite well.

*Case III.*—The wife of Dr. W., aged 45, twenty-six years ago, fell in getting into a carriage, and received a blow upon the breast, which immediately became black and uneasy; she applied leeches upon it, but a small lump remained. Three years ago the swelling began to increase, and, from a rounded form, became oblong, but was free from pain; its increase was so gradual, that little alteration was produced in twelve months. At this time the veins began to enlarge and the skin to be discoloured; yet still it was free from pain. At the end of two years she applied to me, and I ordered leeches, which emptied the veins, but did not diminish the

swelling, for it continued to increase, and several blue spots appeared upon it; but it preserved a globular form: spirituous lotions were applied upon it to check its growth by evaporation.

Two months before the operation the tumour underwent a sudden increase, and was supposed to weigh about five pounds. She was free from pain during the whole progress of the disease; her spirits were good; her activity undiminished, and her constitution was unaffected until the last two months, when she said she felt nervous; and head-aches, which she had always had occasionally, increased in the progress of the disease: the original lump was for a time distinct in the tumour, but at length blended itself with the general mass.

In June, 1818, in the presence of Mr. Cline, I removed this tumour, by making two flaps, as in the last operation, and I tied the arteries which I divided as I proceeded. Little constitutional irritation followed, and in six weeks Mrs. W. was well. The appearances in this breast were similar to those in Lady Hewett's.

*Case IV.*—Mrs. Styles, aged 28, had a tumour in the breast which had existed three years and which was sometimes painful from changes of temperature, and sometimes from the approach of menstruation; but the pain was inconsiderable.

It began in a swelling of the size of a filbert, which was hard and moveable; but it gradually became larger until it was about two inches in diameter: her menstruation and bowels were regular, but rather inclined to costiveness; her general health was good.

My nephew, Mr. Bransby Cooper, removed this swelling, before me; and when he cut into the tumour, a bladder of water was opened.

The cyst, in which the water was contained, appeared very vascular; it was then removed: the wound healed in a fortnight; but an abscess afterwards formed and discharged for six weeks, and then closed. This was therefore a simple cyst, formed in the cellular membrane, containing a considerable quantity of a serous secretion.

We have, in the collection at St. Thomas's Hospital, a large globular hydatid, which Mr. Cline informed me was discharged from the breast.

It appears then, as I have stated, that there are three kinds of hydatid or encysted tumours, in the breast. One, in which the production is a globular hydatid, like that which is considered to be a distinct animal, and which is now and then met with in different parts of the human body; the second, a cyst composed of numerous lamellæ like the crystalline humour; and the other, a bag containing serum, and probably produced by an adhesive process shutting the communication between the cells of the cellular tissue, in which secretion proceeds.

#### DIAGNOSIS.

The marks of distinction in this disease are: 1st, the health re-

maining perfect; 2dly, the almost entire absence of pain, unless there is a suppurative tendency in the cysts, when I have known the disease painful; 3dly, the swelling being firm, smooth, and not tender to the touch; 4thly, when a fluid forms, the fluctuation being very distinct, and a slight blue tinge being observable when it approaches the skin; 5thly, the fluid, when evacuated, having the transparency of water, with a very slight yellow tinge, and this is sometimes succeeded by a discharge of mucus.

#### TREATMENT OF THIS DISEASE.

When the tumour becomes of great magnitude, there is no other mode of relief but by removing it; and, although the complaint be very formidable in point of size, yet the operation is attended with very little danger, and if the arteries have become large, the only care which is required is to secure them during the operation as they are divided.

*When removed by operation, it does not return.*—No remote danger exists, for I have never known this disease return after any operation in which the swelling was clearly removed; although I have (but not in the breast) when a small part of the swelling remained. But the disease does not contaminate the absorbent vessels or their glands, but is to be considered as entirely local.

When a single cyst exists, the swelling does not require removal.

*Case.*—A young woman was sent into Guy's Hospital many years ago, by Mr. Saumarez and Mr. Dixon, who had a tumour in her breast, which at first felt hard, and was about two and a half inches in diameter. Seeing her general health was perfectly good, I applied a plaster, and did no more; the swelling underwent but little change, and she quitted the Hospital. Many months after she applied again for admission, because the swelling was much increased, and I then ordered her into the operating theatre, to remove it; but upon examining it with great attention I felt a fluctuation, and turning to the students, I said, "I shall put a lancet into this swelling to ascertain its contents;" which I immediately did, and serum only was discharged. I introduced a small piece of lint into the orifice, brought on an adhesive inflammation, the sides of the cyst adhered, and the patient did well, having no return of the complaint.

#### ON THE SCIRRHOUS TUBERCLE.

This disease is of extremely frequent occurrence.

The symptoms with which it is accompanied are as follow:

*Symptoms.*—The swelling is generally discovered after it has acquired considerable magnitude, and it must have been the growth of several weeks. It is said to be discovered by accident: but if the patient distinctly traces her feelings, she will have observed



some uneasy sensation, which led her to feel the part. Sometimes the attention is first attracted to the bosom by a drop of bloody serum having stained the linen opposite the nipple, it having flowed from one of the lactiferous tubes. Sometimes a distinct and sharp pricking pain leads to the discovery of the swelling.

*Situation.*—It feels extremely hard. It is evidently seated in the gland of the breast. It is moveable, but more so with the breast than in itself. It is usually distinctly circumscribed, so that the surgeon thinks he is able to decide upon its limits, yet it generally happens that portions of it branch out into the gland and connect it with parts of the breast at a distance.

*Sometimes not tubercular.*—In some instances it is rather a scirrhus inflammation in the breast than a distinct tumour, which hardens and swells the bosom throughout its whole extent. In this state I have seen it cross through the cellular tissue to the other breast, and gradually extend in a similar manner through it. At first the scirrhus tubercle is not painful, but subsequently becomes so; but then the pain is occasional only, occurring at distant intervals.

*Pain acute.*—The pain is excessively severe, commonly as a stab in the part; sometimes a burning heat; now a pricking sensation; then a sense of tearing, as if the nerves of the breast were torn out, or the breast itself tearing off. In other cases the pain is more obscure, like the aching of rheumatism. It generally extends to the shoulder on the same side, and often affects the nerves of the arm.

*Intermittent pains.*—The painful sensations in the breast recur about once in ten days or a fortnight, when the swelling begins to be painful; but more frequently, as the disease advances; and I believe there is an occasional determination of blood to the part, and that the disease increases, particularly when this painful period recurs.

*More severe prior to menstruation.*—Prior to menstruation (about four days,) the breast feels fuller, heavier, and much more painful; and although, from the last-mentioned period it may have been tranquil, it scarcely ever fails to have painful sensations at the return of the menstruation; but more just prior to it, than at the exact moment; for it is relieved so soon as the evacuation begins, and is always much lessened after its cessation.

*Gradual increase of the disease.*—The swelling gradually grows from the size of a marble, when it is first observed, until it acquires a magnitude of two or three inches in diameter; for it rarely happens that the true scirrhus tubercle increases to a very considerable bulk, and this circumstance is one of its criteria.

*Retraction of the nipple.*—The next change is a retraction of the nipple, and this occurs from the lactiferous tubes being drawn out of their course by the swelling, and consequently they draw in the nipple, in which they terminate; frequently also the nipple becomes red, inflamed, excoriated, and sometimes ulcerated.

*Puckering of the skin.*—A change is also produced in the appearance of the skin; it is puckered, so as to resemble a cicatrix, and this arises from its adhesion to the surface of the tubercle. Frequently the follicles of the skin are filled with black sebaceous matter around the nipple, in the areola, and in the skin on the surface of the breast.

*Absorbents become affected.*—The cellular membrane becomes inflamed and hardened, and little tubercles form in the absorbent vessels under the integuments.

*The glands in the axilla enlarge.*—At this period, or sometimes prior to it, the glands in the axilla become enlarged, and many of these are often affected. But if the disease be on the sternal side of the nipple, the gland just above the clavicle at the lower part of the neck, is felt hardened and increased; for then the irritation is extended by the absorbents through the intercostal muscles to the internal mammary absorbent vessels and glands.

*Extends to the clavicular glands.*—When the glands in the axilla have been many of them enlarged and obstructed, I have seen the scirrhus irritation proceed by the absorbents from the axilla to the back of the shoulder, on the scapula, and extend from thence to the glands above and behind the clavicle.

*Exists for years without destroying life.*—Months and sometimes years roll on, and the disease continues in its adhesive stage, and it even often destroys without further change occurring; but frequently it proceeds to a suppurative inflammation: then the skin appears of a livid redness; the pain becomes even more severe; a slight sense of fluctuation, or rather of yielding, is perceived in this part, which gradually ulcerates and discharges only a bloody serum; for true pus is not generated. Pus is attempted to be produced; but it is not formed upon the truly malignant surfaces, but only upon the surrounding parts, if they be ulcerated. I have, however, sometimes seen an approach to suppuration.

*Character of the sore.*—The surface of the sore feels hard, like the original tumour, and is remarkably insensible to pressure: and you therefore will observe the patient wipe it and handle it with a degree of roughness and want of gentleness, which surprises those who are unaware of its little sensibility. The granulations which spring from the sore are imperfectly formed; in some parts rising considerably, in others scarcely any are produced: they differ from common healthy granulations in their hardness, in their insensibility, and in their secretion; which is, as I have stated, generally a bloody-coloured serum.

*The ulcer frequently bleeds.*—Bleedings from the sore are frequent; they occur spontaneously, and relieve the patient's sufferings; and the observation of this may have led to the use of leeches in the treatment of the first stages of the disease: they also arise from removing the adhering dressings, or from wiping the surface of the sore; and the flow of blood does not easily stop, as the ves-

sels have little power of contraction; pressure, however, succeeds in checking the hæmorrhage.

The edges of the sore become everted, the ulceration gradually proceeds until a large ulcer is formed, and often a very deep excavation is produced, so as to expose and even ulcerate the pectoral muscle. At this period, and often before ulceration has commenced, the patient complains of rheumatic feelings in different parts of the body, but particularly in the loins and in the thighs; but I have also known other parts, as the spine, become painful; violent pain and tenderness have been felt in the sternum and ribs, and the patient describes the pain to be that of animals gnawing the parts. I attended Lady M. who, for many weeks before her death, described herself to suffer daily the pains of the rack, arising from cancerous rheumatism.

The appearances produced by this disease in the bones, I shall presently describe.

Great dyspnœa is also attendant upon this complaint, and the patient cannot lie down in bed, or can only rest upon the diseased side; she is also frequently teased with a cough, unattended by expectoration.

Frequently violent spasms are felt, which are referred to the region of the stomach, and they are often attended with vomiting; but, I believe, they arise from a tuberculated state of the liver. The complexion is sallow, with now and then a slight flush upon the cheek.

*Extension of the disease.*—After some time the arm, upon the diseased side, begins to swell above the elbow, then the fore-arm enlarges; at length the swelling extends to the axilla. Its feel is brawny; it does not pit so easily as common œdema; the swelling seems to arise from the loss of absorption produced by the destruction of the texture of the absorbent glands, and from compression upon the veins of the axilla, from glandular enlargement. The constitution becomes excessively irritated by the swelling, by the pain which attends it, and by the augmented disease in the breast, and thus gradually the patient sinks under her sufferings.

#### OF THE DISSECTION OF PERSONS DYING WITH SCIRRHOUS TUBERCLE, OR CANCER.

The tumour in the breast is a solid mass, approaching to the firmness of cartilage, waved upon its surface, composed of fibrous matter within, and the lactiferous tubes may be seen in white lines, taking their course through it.\* If macerated for a time in the same water, the scirrhus matter softens and leaves the cellular texture, in which it has been deposited, with its fibres thickened and unnaturally strong. Processes extend from the swelling into

\* It sometimes happens, that earthy matter is secreted into the lactiferous tubes within the swelling; but this is by no means a constant appearance.



the surrounding parts of the breast, which must be carefully felt for in the living subject, if an operation be performed. The blood-vessels at the edge of the tumour are more numerous than in its substance, unless it be ulcerated, and then around the ulcerated part a great many are seen.

It seldom happens, when a tumour of this kind exists in the breast, that only one is found, for there are generally several smaller in different parts of the glandular structure. The skin often adheres to the surface of the swelling, and the absorbent vessels of the skin have frequently little tubercles in their coats.

If the swelling adheres to the pectoral muscle, scirrhus matter is deposited in the direction of its fibres, and it is converted into a hard and white substance; the glands in the axilla are changed in their internal appearance from the deposit of a scirrhus secretion resembling that in the breast, but more vascular and more quickly ulcerating, and then they become spongy. The glands above the clavicle are in the same state; and those on the left side, when enlarged, press upon the end of the thoracic duct, and disturb its functions, producing excessive pain for some time after taking food.

The glands behind the cartilage of the ribs, when the disease is placed upon the sternal side of the nipple, are generally diseased. It often happens that the axillary glands upon the opposite side to the diseased breast are also enlarged and hardened.

*Of the lungs.*—When the chest is opened, the lung on the diseased side, and sometimes on both sides, is inflamed, and partially adheres to the pleura costalis. Serum is found in the cavity of the pleura, on the diseased side, from which I have known death produced in a few days, after an operation of removing a scirrhus tubercle. When the finger is passed over the internal surface of the pleura costalis, little scirrhus tubercles are felt upon it, and the pleura on the surface of the lungs has similar, but larger, scirrhus swellings.

*Of the liver.*—The liver has frequently scirrhus tubercles on it, more especially when the disease in the breast is seated on the right side.

*Of the uterus.*—The uterus is rarely free from disease; one or sometimes several scirrhus tubercles are formed in it, and this produces the pain in the loins, of which the patient so frequently complains.

*Of the ovaria.*—I have also seen the ovaria enlarged, hardened, and tuberculated.

*Of the bones.*—The bones have frequently scirrhus deposits on the cancellated structure.

We have the sternum, taken from Mrs. Edge, preserved in the collection at St. Thomas's, with scirrhus secretion in it. We have the thigh bone of the same lady, which broke merely in her rising from bed. We have a fractured thigh bone in the collection, taken from another patient, which broke by her turning in bed.

We have also two most curious specimens of diseased spine, in which much of the bone has become absorbed, and scirrhus tubercles deposited in the spaces left by absorption.

*Age at which this disease appears.*—With respect to the age at which the disease appears, I have frequently seen it at all periods between thirty and seventy years. I do not recollect more than two cases, in which the nature of the tumour was decidedly scirrhus, under thirty years. I have seen one case at ninety-three years, another case at eighty-six, and have removed one at seventy-three, ulcerated, and the patient did well. It most frequently occurs about fifty years of age. In ninety-seven cases which I remarked, twelve were of that age.

*Often confounded with chronic disease.*—The tumours which are found in women under thirty years of age, and which are usually called scirrhus, are really only simple chronic enlargements, and are not disposed to malignant action, and do not absolutely require removal.

*Does not always shorten life.*—When the disease occurs in very old persons, it does not in general shorten life; but the patient lives as long with it as probably she would have done if such tumour had not existed, and dies of some other disease. I saw a lady at eighty-six, who consulted me upon the propriety of an operation for this disease, and whom I advised not to submit to it; and after several years, she died of another complaint.

*Occurring at the cessation of menstruation.*—The disease is supposed to occur more particularly at the cessation of menstruation, and which is really the fact, for it is frequently sympathetic with the uterus; but still the exceptions to this rule are very frequent. The symptoms are augmented by the approach of menstruation and decline as the period is passing. The disease occurs more frequently in unmarried women than in others, and in women who, being married, have had no children, probably because the breast has not undergone that change for which nature had designed it, in being the foundation of nourishment to offspring; but yet pregnancy and nursing do not prevent the tendency to disease in some persons; for I have known a woman die of the complaint who had been pregnant seventeen times, and had ten living children.

If a tumour exists in the breast previous to the cessation of menstruation, a malignant action will occur in it at the period of its cessation, or soon after it.

*Many persons in a family affected.*—There are sometimes several persons in the same family who will be affected with this disease. A physician had three relatives, sisters, the first of whom had a scirrhus tubercle of the breast, of which she died. A second had the disease, which was removed by Mr. Lucas, sen.; the disease returned, and she died. The third has applied to me, from a very painful swelling in the breast: they were unmarried. Therefore, in a family in which one is affected, the first dawn of complaint

should be carefully watched, and the general health be well attended to in others.

*Progress of the disease slow.*—The progress of this disease to its termination is always slow; but in some more so than in others; and it is well that patients, who must fall victims to the disease, should know that it often remains stationary, and that I have seen it in one instance seventeen years; one twenty-two years; in the last case the thigh bone was broken by a very slight accident; and, after several months, appeared to be united, and then again became broken, in an effort to remove her from bed. As I was examining the thigh bone, I observed her breast ulcerated, and asked her how long the disease had existed, and she said twenty-two years. The breast on the left side was absorbed, and a scirrhus swelling, with some enlargement, existed over a large portion of the skin, covering the pectoral muscle. Dr. Babington informed me, that he knew a lady, who had symptoms of the disease twenty-four years.

*Cause of scirrhus.*—The cause of this disease is supposed to be some accidental blow, or the pressure of a part of the dress; but although a blow may produce a swelling on the bosom, yet that swelling will not be of a scirrhus nature, unless some defective state of the constitution disposes to malignant action. If the constitution be good, the effects of a blow are speedily dissipated; but if the constitution be faulty, the swelling grows into a formidable disease. The complaint is, in part, constitutional, in part local. It is constitutional in so far as the disposition to malignant action is produced by the state of the habit. It is local also, because the action in the part is peculiar, and the result is a specific effusion different to that of common inflammation. A wound, therefore, made into the parts will produce, on scirrhus disease, a cancerous ulcer; but a wound made in removing the swelling heals like one in any other part of the body. So with respect to the constitution, unless it be changed by a medical treatment, the disease will return as the disposition to malignant action which continues will reproduce it.

*Influence of the mind in predisposing to scirrhus.*—Anxiety of mind, tending to the presence of slow fever, and suppressed secretions, are the predisposing causes of the complaint. A mother watching with anxiety a near and dear relative in sickness; deprived of her natural rest, and inattentive to the deviation from health in her own person, is often afterwards affected with this disease. A person, the prey of disappointment from reduced circumstances, and struggling against poverty, when her prospects begin to brighten, finds a malignant tumour in her breast; costive state of bowels, a dry skin, a paucity of other secretions have attended this anxious state of mind, and laid the foundation of that destruction which awaits her.



## DISSECTION.

In the examination of persons who have died from this disease, besides the affection of the neighbouring glands, scirrhus tubercles are found in many other parts of the body, but more particularly in the thoracic and abdominal viscera.

*Case I.*—In addition to the scirrhus deposite in the sternum of Mrs. Edge (already mentioned,) scirrhus tubercles were found in the following situations:

In the integument covering each breast; in the glandular structure of the breast itself, and in the neighbouring absorbent glands; also in the substance of the pectoral and intercostal muscles.

*Thorax*—On the pleura of each side, and on the pericardium, the cavities of which contained water; also in the substance of each lung.

*Abdomen*—In the liver, pancreas, mesenteric glands, and uterus.

*Case II.*—In the dissection of another patient, who died with an ulcerated cancer on the right breast, scirrhus tubercles had formed in the direction of the internal mammary artery on each side, but more particularly on the right; also in the intercostal muscles. The surface of each pleura, and the substance of each lung, exhibited numerous similar tumours. The bronchial glands were also enlarged from the same cause.

There seem to be three species of scirrhus inflammation.

*Three species of scirrhus.*—First, that producing a tubercle, which gradually grows to the size I have described.

Secondly, That which gives origin to a number of small scirrhus tubercles in several parts of the breast, affecting both breasts, and producing similar tubercles in various parts of the cellular membrane, in the lungs, and in the liver.

Thirdly, A scirrhus inflammation of the breast, which seems to involve the whole of the glandular structure, hardens the whole breast, which becomes attached firmly to the pectoral muscle, and to the skin, and often extends over to the opposite bosom.

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## LECTURE XXI.

### OF THE TREATMENT OF SCIRRHUS TUBERCLE.

No specific remedy having been yet discovered for this disease, all that the surgeon can do is, to employ the constitutional treatment best calculated to keep the disease in check, by lessening inflammatory action.

*Constitutional remedies.*—The same attention is required to the due support of the secretions, as in other complaints of an inflammatory kind; and the pill: hyd: subm: comp: in the quantity of

from three to five grains at night, with compound infusion of gentian, soda, and rhubarb, form an excellent medicine in that point of view.

Steel has been recommended; but although it is useful in another form of disease of the breast, in this it often occasions a feverish heat; therefore it should not be employed unless in cases in which the uterine secretion is defective, and then the Plummer's pill at night, and the following draught twice per diem may be beneficial:

R. Vini ferri ʒj.  
Ammonia carbonat: gr. vij.  
Aq: menth: virid: ʒj.  
Tinct: card: comp: ʒss.

M. ft. Haustus bis die sumendus.

*Opiates.*—Medicine must also be given to relieve the severity of suffering, and to subdue the agonizing pains with which the disease is often accompanied. The tincture of opium, the liquor opii sedativus, the black drop, are given in succession, as either form is losing its effect, combined with the camphor mixture, and a little of the spiritus ætheris comp. which is the best mode of administering them. A patient of mine in Guy's Hospital was much relieved by the stramonium, and this medicine may be given in the following form:

R. Ext: stramonii gr.  $\frac{1}{2}$ .  
Camph: gr. 2.

M. ft. pilula bis terve die sumenda.

Very small doses of belladonna sometimes succeed in diminishing the pain, and I have known bark also mitigate the severity of the symptoms.

As no specific has yet been discovered for this disease (for it would be infamous quackery to say, that any such remedy is known for it) medical men, instead of going over again and again trials of the same means, should endeavour to discover, amidst the numerous new articles of medicine with which chemistry has of late years furnished them, some remedy for this complaint.

When there is cough attended with dyspnœa and pain in the side, a small quantity of blood, viz. six or eight ounces, should be taken from the arm, and then the blood is usually covered with an inflammatory coat.

*Effects of climate.*—Climate has been supposed to be likely to influence the progress of this disease; but so far as I have been able to learn, it has no favourable effect. A lady consulted me, with a scirrhus tumour in her breast, which was removed: soon afterwards her husband's mercantile affairs obliged him to go to the Island of Trinidad, and the wife accompanied him. She suffered greatly from sea-sickness in her voyage, and it might have been expected that this would have produced some change of action in the constitution. From the extreme warmth of the climate, some

favourable change might have been expected to have arisen; yet, in a few months, the disease returned in the breast; and, finding that it was making considerable progress, she determined to return to England. I saw her soon after her return; but the change from a warm to a cold climate had produced no more favourable change than her visit to the warm temperature of Trinidad. The glands in the axilla were enlarged; the breast was ulcerated; her lungs had become affected; her body was emaciated; and it was evident she had but a short time to live. I also lately knew an English lady visit the south of Europe, when labouring under this disease, and there she died of it.

*Vegetable diet.*—It is supposed that a vegetable diet, and food affording little nourishment is conducive to recovery. There is no greater mistake. Whatever weakens leads to an increase of the disease, and to a more rapid termination of the existence. Low living renders the person irritable, quickens the pulse, and makes the constitution feel the disease more strongly. Vegetable diet has not the least beneficial influence over this complaint. Wine and fermented liquors, given so as to produce a quicker pulse, or heat of skin, are equally improper, as a feverish state is equally pernicious with the nervous irritability which low living produces. In short, diet has no specific influence, and that which has agreed best with the patient at other times is the most appropriate under this disease. Meat once per diem, and weak wine and water, as a drink at dinner, agrees best. The other meals, morning and evening, to be as usual.

*Local treatment.*—The local treatment of the complaint consists in subduing inflammatory action; by perspiration; by wearing oiled silk; soap cerate, or a poultice of bread and poppy water; wearing a piece of fur upon the part, or a portion of hareskin, is found to tranquillize the disease.

*Leeches.*—As the pain is occasionally severe, and the disease seems to grow by occasional determinations of blood, it is right at these times to apply leeches; four or six of them may be used, but it is wrong to weaken the patient by their application; and therefore great numbers of them, or a frequent repetition of their application, is wrong. When the pain is excessively severe, it is right to apply the extract of belladonna with the soap cerate.

Cerat. saponis ℥j.

Ext. belladonna ℥j.

Ol. lavendulæ g<sup>tt</sup>. v. M.

*Poultices.*—If there be a disposition to suppurative inflammation in the tumour, it is right to use fomentations and poultices.

When the part is ulcerated and is granulating, the bismuth ointment is a good application; as it also is to an appearance of erysipelatous inflammation on the surrounding skin. The unguentum zinci oxydi, under similar circumstances, may be of service. Chalk and opium I have seen applied with advantage.



When the sore is excessively painful, the following powder should be rubbed upon the parts twice in the day:

Pulv. cinchonæ ℥j.  
 — opii ℥j. Misce.

If the surface of the sore manifests a disposition to slough, it is right to use a carrot poultice, or the nitric acid lotion.

When the arm swells, as it does on the diseased side towards the close of the complaint, it is necessary to apply a roller from the hand to the axilla, and to keep the arm from the side, to allow of as much freedom as possible to circulation and absorption, which are impeded in the axilla, if the arm approximates the side.

#### OF THE OPERATION OF REMOVING A SCIRRHOUS TUBERCLE.

Before the patient be submitted to the operation of having the disease in the breast removed, she will naturally inquire what danger it produces to life, and what prospect it affords of preventing a return. To the first of these the surgeon may confidently answer, that the danger of the operation is very slight; for, in the immense number of cases in which I have performed it, I have lost but five patients: two of erysipelatous fever and inflammation; one from hydrothorax, which was found upon dissection to be connected with the exterior of the disease into the chest, affecting the lungs and pleura; one, a woman of great bulk, in whom the breast was very large; and one from great age.

To the second question, the reply is made with more difficulty. A large proportion of cases return; but fewer than formerly, if the patient, immediately after recovering from the operation, undergoes an alterative course of medicine.

*The only mode of relief.*—It may be truly said, in the present state of our knowledge, the operation furnishes the only hope of preventing the disease from proving destructive, with the exception of very advanced age, in which it makes little inroad on the constitution, and little progress in the parts.

Although the patient may not ultimately survive; yet it may be said, that in cases in which the disease does return, the patient is generally preserved from a most painful and offensive state by the operation preventing ulceration.

On these accounts, I recommend the patient to submit to it. Hope is revived, and the only chance for life is given.

*Parts to be removed.*—If the nipple be drawn in, it should be removed with the tumour: if any cords or roots can be felt proceeding from it, they ought to be removed; and if the skin adheres to the tumour, or be in the least inflamed on its surface, it ought to be removed.

It is not sufficient to remove the tumour, but the gland from the nipple to the tumour must be removed: and the surrounding parts.

to some extent, must be taken away; for the disease does not consist in the tubercle only, but there are roots proceeding from it into the lobes of the breast in its vicinity. It will be sometimes necessary to remove the whole breast, where much is apparently contaminated; for there is more generally diseased than is perceived, and it is best not to leave any small portions of it, as tubercles reappear in them.

*Mode of operating.*—The operation consists in making two semi-circular incisions, nearly perpendicularly, which meet at their points; one on the axillary side of the swelling, and the other on the sternal: the portion of skin over the disease should be removed. Each incision should reach the pectoralis muscle, which should be distinctly seen, and clearly exposed in the operation. As the arteries are divided, an assistant should apply his finger upon them, until the whole of the parts to be extirpated have been removed.

*Removal of axillary glands.*—If a gland in the axilla be enlarged, it should be removed, and with it all the intervening cellular substance, as the absorbent vessels between the swelling and the gland are contaminated; for it is wrong, after removing a swelling from the breast, to make a separate incision to extirpate a gland; but it should be an extension of the first incision from the tumour to the gland.

If several glands in the axilla be enlarged, their removal does not succeed in preventing the return of the disease; some being still seated beyond the reach of the knife. I once saw the axillary vein opened in the operation of removing several of these glands; the gush of blood was considerable, but it was evidently of the venous character; and a dossil of lint, placed in the axilla, stopped the hæmorrhage, and the bleeding did not return.

*Vessels carefully secured.*—So soon as the operation is performed, the divided vessels are to be secured. From faintness and sickness the bleeding stops; but, as soon as action and warmth return, the vessels again bleed. It is therefore necessary to put a ligature upon each artery, for nothing is more annoying to a patient, or alarming to her friends, than after-hæmorrhages: the wound is obliged to be opened; the patient becomes faint; the bleeding stops, and the vessels concealed in coagula are difficult to find. Much time, pain, fatigue, and alarm are saved the patient, by attention in securing the vessels at the conclusion of the operation.

*Use of a suture.*—In dressing the wound, put a suture through its centre, for it produces adaptation, and preserves it better than adhesive plaster. I used to object to a suture, but experience has shown me its utility. The emplastrum thuris compositum and emplastrum saponis p. æq. is the best which can be applied, being less apt to produce erysipelas than the common adhesive plaster.

If erysipelas arise in the surrounding skin, apply flour or starch to the surface.

*Arm to be supported.*—The arm should be supported in a sling. The ligatures may be drawn away in seven or eight days:

In those cases in which there is a general scirrhus inflammation of the breast, I never now perform the operation, because I never knew it succeed. In others, in which a number of tubercles form in the breast, the whole mamma must be removed.

*After-treatment.*—So soon as the patient has recovered from the operation, a medical alterative treatment should be pursued, to change the constitution and prevent the disposition to a relapse into the former disease.

#### ON THE FUNGOUS OR MEDULLARY TUBERCLE.

*Differs from scirrhus.*—This disease differs in many respects from the scirrhus tubercle.

*Occurs at all periods after puberty.*—First, It occurs at all periods of life after the age of puberty, although still more frequently after thirty years of age, than earlier. One of the worst cases I have seen of the complaint appeared at the age of twelve years, and destroyed life at sixteen. It began at the period of the evolution of the breast. It was removed by an operation when of large size: a small tubercle reappeared, and it was also subjected to operation; but the disease again grew, and destroyed life.

*Difference of feel.*—Secondly, This disease is not so hard as the true scirrhus, but has more the feeling of chronic inflammation at its early stages; and as it increases it becomes softer, yields to the impression of the finger, but immediately again fills as the pressure is removed. At this period the skin is of the natural colour, and it so continues whilst the tubercle is in its adhesive stage; but, after a few months, the skin becomes livid, and then a distinct fluctuation may be perceived from a fluid being found, which is contained in a cyst. The veins of the surrounding skin become extremely enlarged and varicose, and the surface assumes an inflammatory appearance, of a darker colour than common inflammation. The cyst next ulcerates; or if opened, in either case, discharges a fluid, which has the character of bile composed of serum with red particles, somewhat changed in their colour: the fluid leaves a yellowish red stain upon paper, and readily coagulates, as serum does, by exposure to heat. The appearance of the fluid differs so entirely from that which is contained in the hydatid cyst, that any one acquainted with the two diseases readily distinguishes the one from the other by it.

After the cyst has been opened, a fungus sprouts forth, which occasionally bleeds profusely, but the bleeding is easily stopped by pressure; the discharge is excessive, wetting a handkerchief through in half an hour, and of a faint and most sickening odour; the edges become everted; a sloughing disposition manifests itself in some parts of the tumour, and occasionally in the whole of the swelling; and I have known the entire disease slough away. I remember, during my apprenticeship at this Hospital (St. Thomas's,) Mr. Cline had a case in which the tumour sloughed away, and the wound



healed, after which the woman was discharged from the Hospital apparently cured; but I am not certain if the complaint did or did not return. In general, however, the profuse discharge, the repeated losses of blood, and the production of similar disease in other parts of the body, lead to the destruction of life. The patient falls a victim to this complaint much sooner than to the scirrhus tubercle, in the majority of cases dying in a few months from the first discovery of the disease.

*Less painful.*—Thirdly, This disease differs from the true scirrhus in being much less painful; in its earlier stages it is altogether free from pain; and I have known it acquire great magnitude with little diseased sensation: even in its most formidable state it is seldom very sensitive.

*Glands not affected.*—Fourthly, The glands in the axilla are not generally inflamed in the same manner as in true scirrhus, by irritation or absorption; for I have known a person die of the disease without the axillary glands being affected: but in some instances they do participate in the disease. The cervical and internal mammary glands are also rarely affected.

*Nipple not drawn in.*—Fifthly, The nipple is not generally drawn in, nor is the skin puckered, having the appearance of cicatrix, as in true scirrhus.

Thus this disease may be distinguished from scirrhus by a less circumscribed and more diffused inflammation; by less hardness; by the formation of a cyst; by the extreme varicose state of the veins; by the fungus which sprouts from it after ulceration; by profuse bleedings; by extensive sloughing; by less pain; by a quicker progress to destruction; by the absence of retraction of the nipple; by the want of puckering of the skin; and by the glands being less affected in the course of absorption.

*Health at first unaffected.*—The patient's constitution at first appears to suffer but little; but after a time, when the process of ulceration begins, she becomes sallow and emaciated; and from the frequent losses of blood has an extremely cadaverous appearance.

#### DISSECTION.

*Adhesive stages.*—The tumour, in its adhesive stage, appears lobulated like an adipose swelling; but the substance, which is effused by the inflammation is more compact, and varies in colour; in some parts assuming the character of common adhesive matter, in others it is softer and mixed with red particles of blood. In its next stage it forms a cyst, which contains the fluid that I have described; and from its interior it is that the fungous growth proceeds, and this has the appearance, when cut through, of soft organized matter; in some parts extremely vascular, in others of the semblance of coagulated blood; other cysts are found containing bloody serum, and a semi-fluid mass, looking like putrid brain,

or sometimes like cream tinged by the colouring particles of the blood.

*Origin.*—It adheres to tendinous structures more than others in its commencement; for example, to the aponeurosis of muscles, as that of the pectoral. I have seen tumours of this kind arise from the deltoid aponeurosis, from the sheath of the femoral vessels, and from the tunica sclerotica; but still the cellular structure, in each part of the body, may become affected by it. In the dissection then of these cases we meet with the glands in the axilla sometimes slightly enlarged; and next, tumours, in various parts of the cellular tissue, in great numbers; the lungs I have seen loaded with them: the liver is generally tuberculated, and I have seen one kidney affected. The uterus has soft tumours on its surface, and sometimes a polypus growing from its interior, which has been called by that able accoucheur, and excellent man, Mr. Clarke, the cauliflower excrescence, or polypus uteri. I have known almost every internal organ affected by it, even the brain itself.

#### CAUSE OF THE FUNGOID DISEASE.

*Constitutional.*—It is evident, in a disease which affects several different parts of the body, out of the line of absorption, that a constitutional cause must exist to produce it: yet it has also a local malignant action, so that a part shall become diseased whilst the surrounding parts still maintain their natural functions. Thus the disease is formed of a constitutional disposition to the complaint, with a local specific action. Upon removing these tumours, the surrounding surfaces generally heal rapidly, and without any malignant action being observed upon the wounded part. The incision, in removing these tumours, must, however, be extended into the healthy parts, at a considerable distance from the diseased; for if there be inflammation in the vicinity of the tumour, the malignant action will recur in it. I have known, in amputating a limb above the elbow, for this disease in the elbow joint, the skin inflamed between the elbow and shoulder, and the stump assumed the fungoid character. Carefully, therefore, avoid cutting near the diseased part, or the complaint will be certain to return.

*Predisposing causes.*—The predisposition to this disease in the constitution is founded upon anxiety of mind, and on those circumstances which have a tendency to destroy the regular and natural functions of the body.

*Treatment.*—As the disease is founded in a constitutional change, and in specific local action, the objects in the treatment will be to correct the general health and to destroy the local and specific action. The first is to be attempted by the alterative medicines already recommended, viz.

Pil. hyd. subm. comp.

and a bitter infusion with rhubarb and soda.

But we are at present entirely unacquainted with any constitutional means, or local application, which has influence over the disease when it has once been manifested.

*Pressure.*—Pressure has been used to produce a slough of the fungus, and it is proper to give it a trial; but it is acting only upon the effect, and will not prevent a fatal termination, as the cause will still remain. Aluminous applications are useful in preventing the growth of the fungus, and the sulphate of iron has a good effect in the same point of view; but I know of nothing which has a specific action upon the sore.

*Its removal by operation.*—It is therefore necessary to remove this disease by operation; and, upon the whole, it less frequently returns than the scirrhus tubercle, if care be taken to extend the operation properly into the sound parts.

The operation presents none of those difficulties which have been described; for it has been said that the vessels are large, and that they bleed so profusely as to occasion dangerous hæmorrhage. It is true, in the swelling they are large: but the arteries of the surrounding parts are but little augmented, and I have never seen any dangerous bleeding from their division. It is certain that the veins particularly, and the arteries of the part, if cut, bleed freely; but they ought not to be divided in the operation, which should be extended beyond its limits: they bleed not only from their size, but from the difference in their structure, having little contractile power.

After the operation, as in scirrhus, the constitution will require an alterative treatment, to prevent the disposition to returning disease.

#### OF THE SIMPLE CHRONIC TUMOUR OF THE BREAST.

This disease is not of a malignant nature, nor does it produce any dangerous consequences. It attacks the young and the apparently healthy, seldom beginning after the age of thirty years; and usually appearing from the age of puberty to that period.

*Appearance of the swelling.*—The character of this swelling is as follows:—it is very superficial, growing rather upon the surface of the breast than in its interior. At first it feels like one of the mammary lobes being enlarged: and then, as if several were combined in one swelling. As it increases it becomes in some degree lost in the substance of the breast. It has not the hardness of the scirrhus tubercle, and it is not accompanied with the loss of health of the fungoid disease. It is an extremely moveable swelling. It is generally unaccompanied with pain, either in the part, or shoulder, or arm, although I have known exceptions to this rule. It grows very slowly and gradually, and does not generally acquire a great magnitude. I removed one which had existed five years, which was not larger than a walnut; and I have seen one which, after fifteen years, still remained but a small swelling.



*Sometimes acquires a large size.*—In a patient sent me to Guy's Hospital, by Mr. Lukyn, of Feversham, the swelling had grown to a great magnitude, but still felt as if composed of a simple enlargement of the different lobes of the mammary gland. I have also seen one case, in Guy's Hospital, in which the disease became excessively large, and it ulcerated and destroyed life. They will be sometimes painful at the period of menstruation: there is nothing malignant in their nature, and I have never known them change their action into the scirrhus or fungous disease, although under changes of the constitution such an event would be possible. The absorbent glands in the axilla are unaffected.

*Diagnosis.*—The diagnosis of this disease consists in the youth of the patient; in the absence from pain; in the appearance of general health; in the slow growth of the swelling; in its superficial situation at first; in its extreme mobility; in its feel being that of the lobes of the breast enlarged, and therefore it is a conglomerate tumour; the glands in the axilla being free from disease.

*Dissection of the tumour.*—Upon dissection, the swelling is found to be composed of a number of lobes connected together by a condensed cellular tissue, and which appear as enlargements of the lobes of the mammary gland. These lobes are composed of smaller, which by maceration may be separated. The appearance of the disease, when cut into, is that of sweet bread, that is lobulated in every part, or composed of large lobes, which are divisible into smaller.

*Cause.*—The cause of the disease is unknown. I have heard it frequently attributed, by the patient, to the pressure of the bones in her stays, or that of some part of her dress.

*Treatment.*—In the treatment of this disease little is effected by medicine. I generally order the emplast: ammon: c̄ hydrargyro to be applied to the part, and give hydrarg: c̄ cretâ with soda and rhubarb, but the disease rarely disappears. The great gratification which the patient receives in this case, is from the assurance that the complaint is not of a malignant nature.

*Removal by operation.*—If the disease increases in spite of an alterative treatment, and the patient becomes anxious for its removal, there is very trifling risk from the operation, for I have frequently performed it at my own house, and the patients have returned home immediately afterwards. When, however, these swellings grow to a very large size, the vessels supplying them become extremely increased; and I remember seeing one removed from the left side, in which case the vessel that supplied the tumour was so large as to afford a gush of blood, which alarmed the surgeon, from the idea of there being some communication between the tumour and the interior of the chest. When they are small, as they usually remain, it is right to secure each vessel which continues to bleed, however slightly, or the wound will be obliged to be re-opened to secure it.

## OF THE ADIPOSE TUMOUR.

In the breast a fatty swelling is sometimes formed. A Mrs. Smith, of Great Yarmouth, applied to me, with an enormous tumour in her bosom. As her general health was good, I advised its removal. It weighed fourteen pounds and ten ounces: the gland of the breast was placed before it. The preparation is in the museum at St. Thomas's Hospital, and she recovered very quickly. The incision for its removal was thirty-two inches in circumference.

## OF THE IRRITABLE TUMOUR.

*Occurring in young persons.*—This disease generally occurs in young women from the age of fifteen to thirty; the swelling never acquires magnitude, and is distinguished from those which I have described by the following circumstances:

*Diagnosis.*—A lobe of the breast is slightly swollen; it is extremely tender to the touch, and, if handled, the pain sometimes continues for several hours. The uneasiness is not seated in the swelling only, but extends to the shoulder and axilla, down the arm to the elbow, and frequently to the wrist and fingers. It is very much increased prior to menstruation, is somewhat relieved during the period, and decreases after its cessation. The pain is sometimes so severe as to destroy rest; and even the weight of the breast in bed is sometimes almost intolerably painful.

*Produces vomiting.*—When the pain is most severe, the stomach sympathizes, and vomiting is produced. The skin is undiscoloured, and there is no external mark of inflammation. Sometimes only a small portion of the breast is affected; at others, the greater part of the bosom; and I have known it affect the breast on each side.

The constitution is highly irritable and sensitive, the hair of the patient is usually light, the complexion extremely delicate, and the temperament sanguineous.

*Continues for a long period.*—I have often known this disease continue for many months, sometimes for years; and once during twelve years.

*Not malignant.*—It has not a malignant tendency, does not therefore produce any dangerous effect, and not only does not require an operation, but such a measure would be quite unjustifiable.

Very frequently this disease is accompanied with an amenorrhœa, or with great paucity of menstruation, paleness of its colour, and frequently it is attended with profuse fluor albus.

*Cause.*—Its causes are irritability of constitution, generally a defect of uterine secretion, and often its immediate exciting cause is a blow.

*Local treatment.*—In the treatment, local irritability is to be

diminished by the application of the belladonna in extract, or opium mixed with the ceratum cetacei; the extractum conii; or the recent conium in a poultice is beneficial. A plaster of soap cerate, to produce perspiration, or the application of hare skin, or some other fur, or the oiled silk applied with the same view, are found to be useful.

*Leeches.*—Leeches are sometimes employed when the pain is excessive, and the vessels of the breast are unusually full. If too frequently used, they produce debility, and add to the irritability of the system.

*Constitutional Treatment.*—The constitutional treatment consists in diminishing constitutional irritability, by restoring defective secretion, in giving tone to the system, and in acting particularly on the uterine secretion.

*Medicines.*—The usual medicines are small doses of calomel and opium, combined with a mild aperient, but those which best agree are the *mistura myrrhæ c ferro*, or the *ferrum ammoniatum*; under the continued use of which the disease gradually disappears. Rhubarb and soda, or these combined with columba, I have also seen very useful.

Conium, combined with rhubarb, I have known beneficial.

#### OF THE OSSIFIC TUMOUR OF THE BREAST.

*Case.*—The following is a case of this disease:—Mary Farmer, aged thirty two, had a swelling in the breast for fourteen years, which had been painful during the latter seven.

The pain was very severe; the skin over it felt hot, and required the constant application of evaporating lotions to keep it cool. The tumour was excessively hard and very painful before menstruation, but greatly relieved after it.

Various applications, as poultices, fomentations, stimulating plasters, did not dispose it to suppurate; in short, all the means employed proved useless. When she consulted me I thought, from the state of the health, the mobility of the tumour, and its peculiar feel, that it was not cancerous; but still I recommended its removal, to which she consented.

*Dissection.*—Upon examination of the swelling, after the operation, it was found to be composed in part of cartilage and in part of bone, the greater part of the former being ossified.

#### OF THE LACTEAL TUMOUR.

*Symptoms.*—Some time after delivery, a woman applies to a surgeon with a fluctuating tumour in the breast, of very considerable size, attended with painful distention, but without discoloration. The veins of the breast are very large. A lancet being put into the swelling, milk is discharged in large quantity, sometimes to



the extent of several ounces; which, after it has stood for some time, separates a cream upon its surface.

*Cause.*—The cause of this complaint is the obstruction of one of the lactiferous tubes near the nipple, or in it.

*Treatment.*—Its treatment consists in leaving the opening made by the lancet to discharge the milk which that part of the breast secretes. The swelling then gradually subsides as the milk in the breast disappears.

I, in one case, saw great inflammation follow the opening; but still it is the only means of relief, unless when the opening be made the child be weaned, and the secretion of milk be arrested, and then the continuance of the opening will be unnecessary.

### BREASTS LARGE AND PENDULOUS.

These glands sometimes grow to an enormous magnitude, about the age of twenty years, so as to hang down upon the abdomen, not from relaxation but from real increase. I saw a case of this kind in a young woman, aged twenty-three, which began three years prior to my seeing her; tender to the touch, of a dark red colour. She was often costive, but regular in her menstruation.

Dr. Babington and myself witnessed the following case:

*Case.*—Miss L. aged seventeen years, of a light complexion and delicate constitution, who is naturally costive, has a remarkable enlargement of her breast. The left is twenty inches from its junction with the chest above to its lower part, and its circumference measures twenty-three inches. The nipple is flattened, the areola excessively expanded. The breast feels as if every lobe of the mammary gland was increased to several times its usual magnitude.

*Treatment.*—The treatment consists in supporting the breasts in a suspensory bandage, in which each breast is received, and this is fixed over the shoulders.

The medicine best calculated to be useful is hyd: c cretā with rhubarb and soda.

### THE MILK ABSCESS.

*Treatment.*—This abscess requires the same general treatment in its adhesive, suppurative, and ulcerative stages, as we have recommended for abscesses of other parts. In general I leave them to break spontaneously; but there are two exceptions to this.

First, When the constitution and patient are suffering severely and the abscess is slow to break, it is right to assist nature with the lancet.

And, secondly, When the abscess forms at the back of the breast very deeply, the aid of an artificial opening is required.

*Formation of sinuses.*—When they ulcerate, sinuses, difficult to heal, are sometimes produced; and the best treatment is to inject

them with a solution of sulphate of zinc, or a dilute sulphuric acid, and to apply it constantly over the breast by linen.

## LECTURE XXII.

### ON URINARY CALCULI.

*Where seated.*—Urinary calculi are found in the kidney, in the ureter, in the bladder, and in the urethra.

*Calculi in the prostate, not urinary.*—The calculi which are met with in the prostate gland, are not urinary; they are formed in the ducts of that gland, into which the urine does not gain access, and they generally differ from urinary calculi in their composition.

### OF THE RENAL OR KIDNEY CALCULUS.

*Symptoms.*—The symptoms by which the presence of a calculus in this organ is known are, 1st, pain in the loin, in the situation of the kidney, which pain extends forwards towards the navel accompanied with a sense of numbness in the bowels, and downwards to the spinous process of the ilium. The pain is of an obtuse kind, it often produces a sympathetic effect on the stomach, and occasions vomiting. The loin is so tender, that the least pressure on it occasions great suffering to the patient. The act of stooping, when a stone exists in the kidney, produces acute pain in the loins, and is sometimes followed by a discharge of bloody urine.

*Case.*—I knew a gentleman, who, in stooping on his horse to open a gate, felt severe pain in the loins; he immediately discharged bloody urine, and afterwards felt the symptoms (hereafter to be described) of a stone passing from the kidney by the ureter. He voided this stone by the urethra, four days subsequent to the first attack of pain in the loins.

The presence of a stone in the kidney is sometimes manifested by extreme irritability of the bladder.

*Case.*—A chemist, in the city, had frequently consulted me (when I lived there) for an irritable state of his bladder and urethra, for which I had recommended various medicines, and bougies had been passed; but he did not experience any relief from their employment. After I left the city, I was informed that he was dead; and upon inspection of his body, no disease of the bladder or urethra was found, but a large stone was discovered in the kidney.

*Sometimes removed by ulceration.*—Nature sometimes succeeds in removing these extraneous bodies by a process of ulceration; an opening being formed in the loins, through which a stone can be felt, by passing a probe, and by which the calculus is ultimately discharged.

*Case.*—A person came to consult me from the country with two openings, one above and one below the last rib, through which three calculi had been discharged. Dr. Marcet analyzed these, and found them to be composed of the ammoniaco-magnesian phosphate.

*Opening to be dilated.*—If the calculus cannot readily pass, from the small size of the opening, the aperture should be dilated by sponge tent; if this fails, a bistoury may be carefully used, as the artery and vein are before the stone.

A stone in the kidney, when very large, may, in some instances, be felt through the loins. Mr. Cline informed me, that a patient consulted him who had this disease, in whom he could distinctly feel the stone, by pressing firmly on the loins; the patient's general health would not at that time bear an operation, otherwise Mr. Cline would have removed the stone by incision.

Upon dissection of persons dying with calculi in the kidney, there are found;

1st, Sometimes numerous small calculi, like grains of sand, in the tubuli uriniferi.

2dly, A stone, lodged in an infundibulum, or often several, occupying different infundibula.

3dly, A large stone in the pelvis of the kidney, connected by processes to others, seated in the infundibula.

*Kidney enlarged.*—The kidney is sometimes scarcely altered in its size, at others it becomes considerably enlarged. If the stone interrupts the passage of the urine to the ureter, the glandular structure of the kidney becomes absorbed, the pelvis and infundibula extremely enlarged, and these membranous bags with the capsule of the kidney only remain.

*Ulcerates.*—Sometimes ulceration of the kidney is produced; it enlarges, then wastes, and gradually becomes in a great degree absorbed; matter is discharged with the urine; high constitutional irritation succeeds, and if both kidneys be affected, the life of the patient is destroyed.

#### TREATMENT.

*Medical.*—The medical treatment of stone in the kidney consists in giving the liquor potassæ; the carbonate of potash, or soda; not that they dissolve the stone, but they prevent the formation of uric acid; the stone becomes encrusted with triple phosphate, which is a softer substance, and, perhaps, less irritating to the surfaces on which it rests; these medicines also deaden the sensibility of the organ itself. If much pain be felt in the loin, the daily exhibition of a purgative, occasional cupping, or the application of a blister to the loins, will be useful. If there be a suppurative discharge, an issue should be made in the lumbar region.



## OF STONE IN THE URETER.

*Symptoms.*—The presence of a calculus in this tube is shown by pain being felt near the spinous process of the ilium, and in the direction of the psoas muscle, if pressure be made upon it through the abdominal muscles; the pain extends in the course of the anterior crural nerve, as the stone descends over the lumbar nerves which form it; also to the testicle, as the stone passes the spermatic plexus; and spasmodic contractions of the cremastic muscle occur, as it passes under the spermatic vessels. The patient is sick, often vomits, is covered with a cold perspiration, and is unusually pallid.

*Case.*—The pain is sometimes so severe, that a gentleman, who had several times suffered from this disease, informed me, that once, when a quarter of a mile from his house, he was seized with this pain, and fell on the ground, being unable to walk until his servants came to his assistance, and carried him home.

*Pain not constant.*—The pain has remissions, and the patient is flattered with the hope of the stone having passed the ureter; but, after a few minutes, it returns with equal violence, and it is only after repeated attacks that it escapes into the bladder.

Calculi in the ureter, I have known destroy life in the following instances:

*Case.*—Mr. Cline had removed a stone from a boy in St Thomas's Hospital, by the operation of lithotomy; the boy had recovered from the operation, when he was seized with rigors, great pain in the course of the ureter, and vomiting; a swelling formed just above the seat of the cœcum, in the right iliac region, which gradually increased, and the boy's constitution quickly gave way. On examination after his death, the pelvis of the kidney and the ureter were found distended with matter; and at the end of the ureter, near the bladder, a stone was discovered, which had prevented the escape of the urine and of matter into the bladder, and thus occasioned death. The preparation of the diseased parts is in the Museum at St. Thomas's Hospital.

*Case.*—Mr. Hallam, of Walworth, gave me a preparation of a stone, stopped in the ureter, which was taken from a patient of his, who had for a length of time discharged matter from the colon per anum; nature had formed an opening for the escape of the urine and pus, in this case, first by producing adhesion between the ureter and colon, and then by making a communication between the two by a subsequent ulcerative process.

*Case.*—We have another curious preparation of a stone in the ureter, surrounded by an abscess, taken from a patient who came to my house for advice. She had great pain in her loins, and tenderness in her abdomen, with so much fever as led me to suppose that she had but little time to live; I advised her to apply to a Mr. Smart, a surgeon, in my neighbourhood in the city, who sent to inform me, a few days after, that she was dead, and that he had

permission to inspect the body. Upon making an incision into the abdomen, there issued a strong urinous smell, and a watery fluid, mixed with matter. The intestines were inflamed and adherent: the bladder was small; one kidney was much enlarged and the other unaltered; the ureter of the enlarged kidney was greatly increased in size and full of matter, it was completely closed at the lower part by a calculus, and had given way above, so as to allow of the escape of the urine and matter into the abdomen.

A calculus may be discharged from the ureter by ulceration through the muscles of the abdomen.

*Case.*—Mr. Stone, of Mayfield, Sussex, gave me a calculus, which was discharged from a man who worked as a gardener. An abscess formed near the anterior superior spinous process of the ilium, from which this calculus and a quantity of matter were discharged. The man recovered.

#### TREATMENT.

*Bleeding.*—If the pain is very severe during the passage of the stone, the patient should be bled largely, to produce relaxation of the ureter, that it may yield to the pressure of the stone and urine, and he should be put into the warm bath, to aid such relaxation. Opium and the liquor potassæ should be given, to allay irritability; and the abdomen should be fomented and gently rubbed from above downwards, in the course of the ureter, in order to assist mechanically the passage of the calculus.

#### OF STONE IN THE BLADDER.

*Symptoms.*—The symptoms change so soon as the stone quits the ureter and enters the bladder; the patient is relieved from the pain in the course of the ureter, in the testis, and thigh, but suffers usually in the following manner:

*Pain in the urethra and at the frænum.*—1st, He experiences acute pain, particularly opposite to the frænum, but also along the course of the urethra; this varies in its degree, more according to the irritability of the patient, than the form or roughness of the calculus; the pain is sometimes slight, but generally severe, and is described by the patient as a cutting sensation; or, sometimes, as if boiling water or lead were passing through the urethra. Relief is experienced by pressing on the glans penis, and adult persons do so; children nip and draw the prepuce until the latter becomes excessively elongated; they also, under severe suffering, after passing urine, cross their legs, and press upon the organs of generation with great force.

The adult, when voiding his urine, often rests his head against the wall, bends his knees, and relaxes the muscles generally.

*Pain after the discharge of urine.*—The pain is felt more after

discharging the urine, when the bladder contracts around the stone, than before it is voided.

Frequently the faeces pass at the same time with the urine, and a prolapsus ani is a common consequence of the excessive action of the muscles of the perineum and lower opening of the pelvis, more especially in children. I have seen the abdominal muscles thrown into violent spasmodic actions for some time after the discharge of the urine, in some of the worst cases of stone.

*Bladder irritable.*—The bladder is very irritable, is capable of retaining but little urine, and becomes diminished in size.

*Sudden stop to the flow of urine.*—Often, as the urine is discharging, a sudden stop to its flow is produced with violent pain, from a stone falling on the beginning of the urethra and acting as a valve; as the force of the bladder's contraction lessens, the stone recedes a little, and the urine again escapes. Patients, therefore, pass their urine best in a recumbent posture, as the stone does not then fall upon the neck of the bladder.

At first no change is produced in the appearance of the urine, which can direct the judgment; but when the disease has existed for some time, and more especially from violent exercise on horseback, or in a rough carriage, the urine becomes bloody. A person having a stone in the bladder cannot ride far on horseback without dismounting to pass his urine; and is obliged to quit a carriage often for the same reason.

*Discharge of mucus.*—As the disease increases the bladder becomes more irritable, the urine is loaded with mucus, and sometimes precipitates a white sediment, composed of flakes of adhesive matter, thrown out by the mucous membrane of the bladder, when it has become inflamed. This state is often attended with rigors, succeeded by heat, and other symptoms of intermittent fever, and matter is sometimes discharged with the urine. The mucous membrane of the bladder becomes ulcerated when a stone has existed long; the patient loses his health; is incapable of getting sufficient rest; and thus he is destroyed by the disease.

A person labouring under this complaint walks with excessive care; he does not raise his feet much from the ground, to prevent any shock to the body, which would create pain and occasion spasmodic action of the bladder; he also lies down with great caution, as the sudden change of posture might alter the position of the stone and produce irritation.

#### DISSECTION.

*Mucous coat.*—In examining persons who die with a stone in the bladder, the mucous membrane appears loaded with blood, it is thickened, and highly villous. Its muscular coat is much increased, and the capacity of the bladder lessened. Numerous sacculi are sometimes formed, the mucous membrane being forced between some of the muscular fibres, and, in these bags, stones are wholly



or partially received. We have a preparation in the museum showing this state of the bladder, with stones lodged in these sacculi.

*Ulceration of the mucous coat.*—I have seen ulceration of the mucous membrane, and we have an example of stones ulcerating the basis of the prostate, and making their way into the urethra.

*Bladder contracted in part.*—We have also another very curious specimen, in which the upper part of the bladder had contracted around the stone, whilst the lower part is in the natural state.

A stone is often found with an enlarged state of the prostate gland; and in some cases is met with in a bag, formed directly behind the prostate.

*Hour-glass contraction.*—We have a preparation showing an hour-glass contraction of the bladder, in which one large stone is lodged in the superior part, and several in the inferior; and another, exhibiting a stone in the bladder, with a large fungus growing from the prostate gland.

*Ureters.*—The ureters are dilated, the kidneys enlarged; sometimes one is enlarged and the other wasted from an ulcerative process.

*Size of calculi.*—The size of calculi generally varies from a drachm to two ounces; but the weight is not always proportioned to the size, but depends upon the composition of the stone.

The largest stone, which I have successfully extracted, weighed near six ounces. At the Norfolk and Norwich Hospital there is one of eight ounces. Mr. Mayo, of Winchester, removed one, in fractured portions, of fifteen ounces. I have one in my possession which I extracted, but not successfully, weighing sixteen ounces. We have a model of a stone, given to the collection by Mr. Foster, which, I understand, was twenty-five ounces in weight. One in Trinity College library, at Cambridge, weighs thirty-two ounces and seven drachms. But the largest stone which has been found in the human body is that given to the College of Surgeons by Sir James Earle; this weighed forty-four ounces.

*Pain not more severe from a large stone.*—The severity of the symptoms is often in an inverse ratio to the size of the stone; which, when it is very large, produces less pain, because the urine dribbles away, or is voided by very slight contraction of the bladder.

*Number of calculi.*—The number of calculi is very various; but in the majority of cases only one is found; two or more not unfrequently exist. I have extracted nine in one case, thirty-seven in another, and the greatest number I ever extracted in the operation was one hundred and forty-two; these were from Mr. Allis, of Worcester, a patient of Mr. Carden; I have them now in my possession, many of them are about the size of marbles.

*Removal of a number of stones not dangerous.*—A great number of stones does not add much to the patient's danger in the operation; for it is not the frequent introduction of the forceps into the bladder, but the violence which is used in extracting the stone or

stones which produces mischief; thus the removal of one large stone is more to be dreaded than that of many small.

*Stones rounded or hollowed, when more than one.*—When more than one calculus exists, the first extracted is found smooth, and often hollowed by the friction of the others; so that the form of the first shows the existence of a second or more.

*Form of Stones.*—The form of stone varies extremely; but when there is only one, it is generally oblong; when more than one they are usually rounded and smooth; and when very large, they assume the form of the bladder.

*Surface of Stones.*—The surface of stones is sometimes smooth, as the uric acid calculus; a little irregular when composed of triple phosphate; and very rough if formed of the oxalate of lime: this latter is called the mulberry calculus. But the severity of the symptoms does not always depend on the irregularity of the surface of the stone, but on the irritability of the bladder.

*Composed of lamellæ.*—Calculi are generally composed of concentric lamellæ, formed upon a centre, called the nucleus. The colour of the different layers varies considerably, and the materials of which they are composed are of very different nature: some calculi are brown, some are white.

*Nuclei.*—The nucleus, or centre, is often some extraneous body introduced into the bladder, as a portion of coagulated blood, a piece of bougie, or catheter.

In the collection at St. Thomas's Hospital are preparations exhibiting various foreign bodies, as forming the nuclei to stones; as a portion of slate pencil; a needle, which had traversed a part of the body previous to its entering the bladder; also a piece of tobacco pipe, which had been introduced into the urethra by the patient, to relieve some impediment to the passage of the urine, it broke and passed into his bladder, and was extracted some time afterwards by Mr. Godwin, surgeon, at Derby, with a stone formed around it. Sometimes a small stone of uric acid forms in the kidney, and descending by the ureter into the bladder, it there acquires an increase from the formation of a calculous deposit on it, of a different nature.

#### COMPOSITION OF URINARY CALCULI.

My friend, Dr. Dowler, who has paid much attention to the analysis of these calculi, has favoured me with the following account:

Urinary calculi of the human body may be comprehended under the following species.

1. Lithic acid, or uric acid calculus.
2. Lithate of ammonia.
3. Phosphate of lime, or bone earth.
4. Triple phosphate, or phosphate of magnesia and ammonia.
5. Oxalate of lime, or mulberry calculus.

### 6. Cystic oxide.

Besides these, other substances have been mentioned as forming distinct species of calculi, such as xanthic acid, carbonate of lime, and the fibrinous calculi but they are of extremely rare occurrence.

The above calculi present the following chemical characters.

1.\* **Lithic acid calculus.** Before the blowpipe it blackens and emits a peculiar smell, somewhat resembling that of burnt feathers; it is soluble in the caustic fixed alkaline solutions by the assistance of heat, and is again precipitated from these by the addition of an acid. The nitric acid dissolves and decomposes it with effervescence; if the solution be evaporated to dryness, a new acid, called the purpuric, and ammonia are formed; these, uniting, produce a purpurate of ammonia, which is of a pink colour, and soluble in water.

2. **Lithate of ammonia.** By the addition of a caustic fixed alkali, ammonia will be disengaged. The lithic acid may be shown by treatment with nitric acid, as in the former instance. When mixed with triple phosphate, its presence is ascertained with difficulty. It is more soluble in water than the lithic acid calculus, and is of a clay colour; but its characters have not as yet been sufficiently investigated.

3. **Phosphate of lime.** Before the blowpipe, it first blackens, then becomes white, and afterwards resists the action of heat. If, after being heated in order to decompose the contained animal matter, it be dissolved in very dilute nitric acid, the subsequent addition of nitrate of silver, will produce a yellow precipitate, which is a phosphate of silver, and of course indicates the presence of phosphoric acid. The lime may be detected by adding oxalate of ammonia to the above nitric solution.

4. **Triple phosphate.** Before the blowpipe, it emits an ammoniacal smell, becomes reduced in size, and at length melts with difficulty. The caustic fixed alkalies disengage ammonia. It is very soluble in dilute acids, and the subsequent addition of ammonia causes it to be precipitated in a crystalline form.

5. **Oxalate of lime.** When heated by the blowpipe it swells, its oxalic acid is decomposed, and the lime is left in the caustic state. When digested with carbonate of potash, a double decomposition follows; and the oxalate of potash, thus formed, presents its peculiar characters, which are indicative of the presence of oxalic acid.

6. **Cystic oxide.** This calculus may be readily distinguished by its external appearance. Before the blowpipe it emits a peculiar and foetid odour. It is soluble in a solution of the neutral carbonates of soda and potash; also in those of the caustic alkalies, and most of the acids. Its solution in nitric acid is precipitated by alcohol.

\* I have omitted every character which is not essential to the particular species.—D.



The xanthic oxide, of which only one specimen has as yet been observed, was so named by Dr. Marcet, from the circumstance of its producing a peculiar yellow compound with nitric acid.

Carbonate of lime is sometimes, but very rarely, met with, forming small urinary calculi. These effervesce in dilute muriatic acid, and a precipitate is formed by the addition of oxalate of ammonia to the muriatic solution.

The fibrinous calculus, observed by Dr. Marcet, was probably formed from the fibrin of blood which had accidentally escaped into the bladder: it possessed the usual character of fibrin.

Mr. Brande analyzed one hundred and fifty stones, from the collection of Mr. Hunter, and the materials of which they were composed were as follow:

Uric acid . . . . .	16
Uric acid plus, triple phosphate minus . . . . .	45
Uric acid minus, triple phosphate plus . . . . .	66
Triple phosphate . . . . .	12
Uric acid on phosphate nuclei . . . . .	5
Oxalate of lime . . . . .	6

In addition to these, Dr. Wollaston found one of the cystic oxide; but Dr. Marcet met with this stone in the kidney: it is not composed of lamellæ, like the other calculi.

#### TREATMENT.

*Medical treatment.*—With respect to the medical treatment of calculi, I do not believe in the power of chemistry to dissolve a stone in the bladder, if it acquire any considerable magnitude. The medicines, given for this purpose, become so much changed in their passage through the circulating and secreting system, that their chemical influence is in a great measure destroyed. They may alter the surface of a stone, so as to render it soft and less irritating; but they do not prevent a calculous secretion.

*Case.*—Dr. Baillie and myself attended a gentleman from Birmingham, who secreted a large quantity of triple phosphate, which appeared in white crystals in his urine: we gave him the muriatic acid, and the secretion of the triple phosphate ceased, but uric acid was produced in equal abundance: he had then alkalies given to him, and the triple phosphate reappeared; he was at length, but not under many months, cured by attention to his diet and general health.

*Case.*—I had a patient in Guy's Hospital with a stone in his bladder, in whom various experiments were tried to dissolve the stone by chemical menstrua. A catheter was introduced into the bladder, and through it injections were thrown; thus an opportu-

nity was given for a direct application of the menstruum to the stone. After a lapse of time, I said to this man, "Well, have my medical friends dissolved the stone?" his answer was, "No, Sir, and I have given up all the injections except opium, from which I receive considerable relief." The patient died in the Hospital, and, on examination after death, a stone was found in his bladder.

*Alkalies may lessen the sufferings.*—But although a stone cannot be dissolved in the bladder, yet the irritability of the latter may be so far diminished by alkaline remedies, as to enable the patient to bear the disease with much less suffering.

*Case.*—Admiral Douglas was the subject of stone; I sounded him, and in the evening of that day a portion of the stone was discharged by the urethra, and I sent it to my friend Dr. Marcet for analysis, who found it to be oxalate of lime; I therefore gave him acids, but he was not relieved by their use; he then took subcarbonate of soda  $\mathfrak{zss}$ . four times in the day, in some water. Some months afterwards I was requested to meet Dr. Reynolds and Sir E. Home in consultation upon the case of the Duke of Portland; and when I entered the room, Sir Everard said, "Cooper, how did you dissolve the stone in Admiral Douglas?" to which I answered, "I never dissolved a stone in my life."—"But," said Sir Everard, "he expresses himself well from some medicine you ordered him." I called in consequence on the Admiral at his hotel; when he said, "You saw me in dreadful agony, unable to cross a room; but since I have taken the soda, I went from Yarmouth, in Norfolk, to Portsmouth, by land, and bore the journey well; and I could now go down a country dance." Yet the stone still existed in his bladder; but the soda had lessened its sensibility, so as to enable him to bear the complaint without much suffering, and only a little inconvenience from the stone, which still occasionally stopped the flow of urine.

*Magnesia and soda.*—Magnesia and soda have been recommended together; but as many stones are magnesian, the use of the former medicine may be improper.

*Diluents.*—Great dilution relieves the severity of the symptoms, and more especially mucilaginous drinks.

*Stomachic medicines.*—Medicines which assist the digestive process are the most appropriate to prevent this disease, as it is often the result of taking food which is difficult of digestion; or of a weakened state of the stomach, which renders common food indigestible.

*Disease returns.*—After removing a stone from the bladder, a medical treatment should be adopted, to prevent a return of the disease. The uric acid and oxalate of lime calculi return less frequently than the triple phosphate, which are very often reproduced.

*Case.*—I cut a Mr. Miles for the stone, and removed a triple phosphate calculus; in about twelve months the disease returned, for I sounded him, and found a stone. Mr. Lyford, an excellent surgeon at Winchester, extracted this stone by the usual opera-

tion; yet, on examination of this gentleman's body after his death, which occurred several months subsequent to the second operation, several calculi were found in his bladder.

In another case, in which I extracted a triple phosphate calculus, from a patient of Mr. Van Oven's, in the city; the disease returned, and I again performed the operation, and found a large coagulum of blood in the bladder, surrounded by a triple phosphate deposite.

## LECTURE XXIII.

### OF THE OPERATION OF LITHOTOMY.

*Previous inquiries.*—BEFORE performing the operation for the stone, it is right to inquire carefully if the functions of the body are well performed in other respects: if the digestion be tolerably good, and the breathing and circulation be free. For if the liver be diseased; if the chest be oppressed; or if the heart have an irregular action, the patient does not in general recover from the operation. Pain in the loins, vomiting, or the discharge of matter, indicating disease of the kidneys, also form insuperable objections to the operation.

*Case.*—A patient came into Guy's Hospital to be cut for the stone; I sounded him and found a calculus, but he made water almost immediately, and at the time discharged a considerable quantity of matter. I saw that he was emaciated; he complained of pain in his loins, and his stomach was much disordered. I therefore said, "I will not operate upon this man, for he would die from the operation." In less than a month he died, and I was happy that I had not operated, as one kidney was found wasted, and the other at least twice its natural size, with its cavities full of a purulent secretion.

The success of one surgeon being greater than that of another chiefly depends upon his judgment in this respect, viz. not to operate when there is much functional or any organic disease.

*The age of the patient.*—The age of the patient does not much influence the result of the operation, with the exception I shall mention. Old age is not to be a bar to it, if, so far as the stone will permit, the patient be active, and has no other complaints. I generally, therefore, say to a patient, "If the stone were removed, would you be capable of taking exercise? is your digestion good? is your breathing free?"—If he answers, yes, the operation may be performed.

Mr. Cline operated successfully upon a patient at 82: Mr. Attenborough, of Nottingham, at a still more advanced age. I operated upon a gentleman aged 76, who had been near sixty years in the island of Jamaica: I performed the operation in 1812, and he



died about ten years after, having returned to Jamaica and enjoyed his health there.

*Sixty a favourable age.*—About sixty years of age is the period at which stone is most frequent in the adult, and then the operation is very successful. In the middle period of life, fever is more violent from the operation, and the patient is often too much loaded with adeps to be submitted to it. Fat persons do not generally bear operations well, they have little vital power; they should be reduced by diet and medicine, and they must be accustomed to irritation of the bladder, by the frequent introduction of the sound; but still they have more fever and disposition to peritoneal inflammation, than at a later period of life.

*The most favourable age.*—The age at which there is least danger from the operation is from three to twenty, for death is then a very rare occurrence. Under the age of two years, children often become convulsed and die from the operation, on account of their excessive irritability.

*Average number of deaths.*—The number of deaths from the operation, taking all ages, is one to eight. Fat persons at all periods, but more especially in middle life, are those who most frequently die. A surgeon sometimes proceeds to twenty or even thirty cases with extraordinary success; but then he loses several patients, which still produces the average I have experienced.

*Previous preparations.*—A short time prior to the operation, in addition to the exhibition of purgatives, &c. an enema should be administered, in order to empty the large intestines, and particularly the rectum, which, if distended with fæculent matter, would be in great danger of being wounded.

#### OF THE OPERATION.

*The table.*—The table, on which the patient is to be placed, should be two feet six inches high: it is to be covered with two blankets and a sheet, and several pillows are required to support the patient's head and back.

*Bandages.*—Three bandages are required to secure the patient; of these, two are employed to confine each hand and foot of the same side together: a loop, at one extremity, is first passed around the wrist, and the patient then grasps the outer side of the foot, about its middle, having the bandage passing from the wrist between the two; the bandage is then passed under the foot, brought round on its inner side over the instep, and so round the wrist and ankle; after two or three turns around these parts, it should be passed over the hand and under the foot, then to the wrist and ankle again, until the whole is used. The other bandage is to be placed round the back part of the neck, and each extremity being passed under the ham of the same side from within to without, they are to be carried back and tied behind the neck. These bandages prevent the patient from making any movements likely to impede the operation, or occasion danger during its performance.

*Instruments, 1st, The sound.*—The instruments required are, 1st, a sound, consisting of a solid portion of steel, curved as the urethra, about twelve inches in length; its thickness should be well proportioned to the size of the urethra.

*State of the bladder when sounding.*—Persons often require to be sounded with their bladder full, and with it empty. I have frequently found a stone directly after the urine has been discharged, which I could not perceive when there was much urine in the bladder. It is right, therefore, to sound the patient first with his bladder full; and, if the stone cannot be felt, then to have it emptied, and sound again. On this account, it is often useful to employ a silver catheter, at first preventing the escape of the urine, and afterwards allowing it to flow through the instrument, at the same time continuing to sound. When the bladder is empty, it frequently happens, however, that the instrument is so confined that it cannot be moved sufficiently to strike the stone.

*Position of the patient.*—The patient should be sounded first in the recumbent position, and if the stone be not then felt, in the erect; as the calculus, by falling upon the urethra in the latter posture, may be easily detected.

*Stone not always detected.*—I have myself sounded and not detected a stone at one time, which I have afterwards felt. I have sounded and not discovered a stone, which another surgeon has afterwards perceived. I cut a patient and extracted thirty-seven stones from his bladder, who had been sounded and declared not to have a stone.

Those who have not had experience in this disease, and have not frequently sounded patients afflicted with it, sometimes mistake the extremity of the sacrum, or the os coccygis, for a stone.

*The staff.*—The next instrument is the staff, which is somewhat similar to the sound, but rather more curved, and having a groove on its convex part; this groove should be as large as possible; 1st, because it is more easily cut into; 2dly, because the gorget or knife passes more readily by it into the bladder.

*How to be held.*—When performing the operation, the staff is to be held by an assistant, perpendicularly, or nearly so; and its extremity should, if possible, rest upon the stone; its groove is to be slightly inclined to the left side of the raphe of the perineum. Nothing can be more unsafe than to incline the handle of the instrument towards the patient's abdomen, as it draws its point out of the bladder into the urethra; and when the gorget or knife are passed on it towards the bladder, either is likely to slip between it and the rectum.

*Position of the patient during the operation.*—Before commencing the first incision, the surgeon should see that the patient be placed evenly upon the table, so that one side be not higher than the other; and also that the shoulders be sufficiently raised and well supported.

*The scalpel.*—The knife, for commencing the incision in perineo,

should have a considerable convex cutting edge, as by it the urethra is more freely opened. The scrotum being elevated, the incision is begun opposite the under part of the arch of the pubis, and is continued on the left side of the rapha, along the perineum, as far as mid-way between the tuberosity of the ischium and the anus.

*The first incision.*—The first incision should divide the skin, &c. and expose the accelerator urinæ; the second should be carried between the left crus penis and the bulb; the latter being pressed towards the right side by the fore finger of the surgeon's left hand.

A part of the accelerator urinæ is divided, and the transversus perinei should be freely cut, as it forms a great impediment to the extraction of the stone, if undivided.

*Opening the urethra.*—The next incision should be made into the groove of the staff, by cutting into the membranous portion of the urethra; for this purpose the knife must be directed upwards, and not horizontally, otherwise the rectum is endangered: the opening made to expose the groove of the staff should be an inch in length.

A gorget, or a knife with a probed extremity, is next usually employed, to complete the opening into the bladder.

*The gorget.*—The gorget may be considered as the divider of the prostate gland, and it also serves as a director to the forceps. It was formerly used with a blunt edge, so that it acted as a wedge: when so formed and employed, the scalpel should be carried along the groove of the staff, so as to divide the prostate gland laterally, after the urethra has been opened, which allows the blunt gorget to enter the bladder with comparative facility. The operation performed with this instrument is attended with very little bleeding, and has been very successful in its issue.

*Cutting gorget.*—Hawkins had one of the edges of the blunt gorget made cutting. Mr. Cline made the greatest improvement upon the cutting gorget, in having the left side entirely removed, leaving only the beak and its right blade, which had a sharp anterior edge: this instrument enters with ease. It should be introduced horizontally, for there is considerable hæmorrhage if it be introduced obliquely, as it then opens a plexus of vessels surrounding the prostate, and which is continued to the vesiculæ seminales, and terminates in the internal iliac veins.

*Hæmorrhage.*—It is quite contrary to my experience to say, that persons do not die of hæmorrhage after this operation, for I have known many instances of it; four in particular, in which death was the immediate consequence of bleeding, suffered to continue for several hours; and several I have known die from gangrene of the scrotum occurring after severe hæmorrhage. The patient should never be left until the bleeding has ceased; and, if it be very considerable, the surgeon should place his finger within the wound and compress the bleeding vessel; but he should be careful not to quit his patient whilst any hæmorrhage remains.



It is best to use a small cutting gorget, as it lessens the danger of wounding blood-vessels; and then, if necessary, on account of the size of the stone, to dilate the wound, do it with the blunt gorget.

*Mode of passing the gorget.*—The beak of the cutting gorget is passed into the groove of the staff, where it has been previously opened at the membranous part, and the instrument is then pushed along the groove into the bladder, so as to divide the left half of the prostate gland. It is necessary to press the beak against the groove as it glides along, and occasionally to move it slightly backwards and forwards, to be certain that no portion of membrane has got between the two: when the gorget enters the bladder, the urine flows out over its superior concave surface.

*Size of the gorget.*—The length of the gorget should be proportioned to the size of the patient. The breadth of its cutting part, when used for an adult, should not exceed one inch; and the blunt gorget should be used, if the first opening be not sufficiently free.

The gorget which I at first used in my own operations was double, and cut upon both edges; but I thought it occasioned too much bleeding, and divided more than was absolutely necessary for the removal of the stone.

*The knife.*—The knife is now frequently substituted for the gorget, and that which I for some time employed, in various cases, was straight and narrow, with a probed end.\* After opening the membranous part of the urethra, as before, I passed this knife along the groove of the staff into the bladder. In the young this answers very well, and also in a thin adult; but in a deep perineum, or enlarged prostate gland, I prefer the gorget, as being more definitive in its cut.

*The forceps.*—Forceps of various sizes are also required to lay hold of the stone, and those employed must depend on the bulk of the patient; the handles should occupy two-thirds, and the blades one-third of the length. I have tried many others of different proportions, but think that which I have mentioned the best. Some of the blades must be flat, for small stones, or fragments of stones; some should be curved, to remove calculi from behind the pubes or prostate: one pair should be large, as small forceps will not retain a large stone in their grasp, with sufficient firmness to extract it.

The forceps must be passed along the groove of the gorget with great care, and the gorget must be well retained during their passage. I have seen the forceps pass between the bladder and rectum, from the surgeon's pulling back the gorget as he thrust forwards the forceps, which should never be done.—The gorget must not be removed until the surgeon has thrust his finger forwards to feel that the

\* Mr. Thomas Blizard, who was an excellent and successful operator, employed a knife of the same kind, excepting that the beak was at an angle with the blade, instead of straight.

groove of the staff has been freely opened. I frequently if the perineum be not very deep, remove the gorget after it has entered the bladder; and introduce the forceps by my finger, carried along the groove of the staff.

*Mode of using the forceps.*—When the forceps have passed into the bladder, the gorget and staff are to be removed; and the surgeon, before opening the forceps, should sound with them for the stone. When the situation of the calculus has been thus ascertained, the blades of the forceps are to be separated and the stone received between them; and this must be done with great gentleness, not only to save the patient pain, but to prevent any injury to the internal surface of the bladder.

When the stone is drawn down to the opening in the perineum, wait a little for the cessation of muscular action from the perineal muscles, and introduce the finger by the side of the forceps, to feel if any obstruction exists, and to press it out of the way of the stone; for the finger is the best instrument for this purpose. It is right to turn one blade of the forceps to the pubes and the other to the rectum, as the stone cannot then injure the urethra. If the extraction of the stone be violently resisted, disengage and remove the forceps, then introduce the finger and feel how the stone is placed, and, if necessary, turn its long axis into the direction of the long axis of the bladder.

Having grasped the stone with the forceps, do not be hasty in extracting it, but be gentle in the employment of your power, depending upon the gradual rather than the sudden exertion of force. The great danger, and the most frequent cause of death, in my opinion, arises from the surgeon's employing excessive violence with the forceps. 1st, Bruising the bladder: 2dly, Disengaging it from its situation by tearing down its natural adhesions; it injures the peritoneum and brings on peritoneal inflammation: 3dly, It injures the prostate, sometimes tears the urethra at the membranous portion; and I have known the rectum lacerated where it had not been injured by the incisions, which can only arise, in the use of the knife, from ignorance or negligence.

If the stone cannot be grasped with the straight forceps, a curved pair should be employed.

The operation for the stone consists, therefore, 1st, in opening the membranous part of the urethra, and dividing the transverse perineal muscles on the left side with the knife, and exposing the groove of the staff: 2dly, in dividing the left half of the prostate gland horizontally, and that portion of the bladder connected with it, by means of the gorget for probed knife: 3dly, in introducing the forceps, by which the stone is seized and extracted.

## OF THE DIFFICULTIES AND DANGERS OF THE OPERATION FOR THE STONE.

*Stricture in the urethra.*—If the urethra be the subject of stricture, do not perform the operation until it will admit a large staff. The strictures being removed, the operation is less difficult, and the recovery quicker and more certain.

*Enlarged prostate.*—An enlarged prostate gland offers great difficulties to the operator, and if the stone be of large size, the patient will seldom recover, as the impediment to extraction is excessive, and the violence obliged to be used such as the patient can ill bear, at the period of life at which such disease of the prostate occurs. It is, therefore, in such cases, a very fortunate event when the stone breaks as it is removed with less risk to the patient, although it renders the operation tedious.

*Lateral enlargement.*—A lateral enlargement of the prostate gland produces less difficulty, if it be freely divided, than the enlargement of the middle lobe; and this gland should always be examined per anum in aged persons, to prevent the surgeon being baffled by this disease, and if he finds it enlarged laterally, he must use a large gorget, or else divide freely with the knife.

*Middle enlargement.*—If it be an enlargement of the third lobe, the circumstance is known by the passage of the staff, which only enters the bladder by its handle being greatly depressed; also by the stone being felt distinctly at one time and not at another; and here let me observe, that when this happens in sounding, I have generally found some difficulty in the operation. The curved forceps are proper to be used in this form of disease.

*Sac behind the prostate.*—The enlarged prostate gland often gives rise to another difficulty, by occasioning a sac to be formed immediately behind it, in which the stone is principally lodged, its extremity only projecting into the bladder, so as to be felt by the forceps; in this case the curved forceps are required, and the finger must be passed up the rectum, to raise the stone from this situation, and to bring it into the axis of the bladder.

*Part of the prostate nearly detached.*—A portion of the prostate is sometimes nearly separated in extracting the stone, so as to be afterwards pendulous into the bladder; this occasions symptoms somewhat similar to those of the stone to remain. This happened to Mr. Cline, who operated upon a gentleman very successfully as to the immediate result, but who, after his recovery from the operation found all the symptoms of stone return. He lived a long time after, and before his death desired that his body might be opened. Mr. Ramsden inspected the parts, and sent me the bladder, which is now in the collection at St. Thomas's Hospital, and a portion of the prostate gland hangs by a narrow neck into the bladder this portion, by falling on the urethra, produced the symptoms.

*Enlargement of the third lobe.*—From the enlargement of the



third lobe of the prostate gland, little advantage is, on the same account, derived from the operation of lithotomy, as the patient still experiences all the symptoms of stone, excepting that the urine is not usually bloody; but even this circumstance I have known to happen.

*Contraction of the bladder.*—I have seen a difficulty arise in performing this operation, from a partial contraction of the bladder, by which the stone has been firmly embraced, so as to impede the use of the forceps. This arises from the sudden escape of the urine which the bladder contained previous to the operation. The fundus of the bladder, and half of the organ near to it, embrace the stone closely, the forceps are passed into the inferior part of the bladder and opened at its cervix; but, in attempting to seize the stone, only one of its extremities is nipped by the forceps, which slip from it immediately when the surgeon tries to extract the calculus; this occurs several times, until the patient becomes exhausted, when the contraction of the bladder subsides, and then the stone is readily seized. In such a case, the flat forceps answer best, gliding most easily over the stone. If the patient does not retain his urine for a long period before the operation, this difficulty seldom occurs.

*Narrow pelvis.*—In persons who have been the subject of rickets; the pelvis is sometimes so narrow as to render the performance of this operation excessively difficult. I once saw Mr. Cline operate in a case of this kind, and only his coolness and perseverance could have overcome the obstacles it presented. The subject was a child; the tuberosities of the ischia were very near each other, and when the forceps were introduced into the bladder, only the handles remained external to the wound; the extremity of the stone only could be caught hold of, and from this the forceps repeatedly slipped. Mr. C. finding that the longest pair of forceps, usually employed for children, would not reach beyond the centre of the stone, and that it could not be held by them, introduced a pair of forceps made for an adult, and with these he succeeded in grasping the stone, but the opening of the pelvis was too small to admit of its being extracted whole; he, however, after repeated efforts, broke the calculus with the forceps, and removed it by fragments. The child afterwards recovered.

*Large stone.*—The stone is sometimes so large as to produce great difficulty in the extraction. The largest which I have successfully removed has been between five and six ounces; but I remember to have seen one in the Norwich Hospital which weighed eight ounces, and was extracted without being broken. If broken, a very large stone may be successfully removed. Mr. Mayo, of Winchester, in this way, extracted one weighing altogether fifteen ounces. The largest which I have extracted whole was from Mr. ———, of Fore street, in the city, a relation of Mr. Field's, surgeon, in Wilderness Row; it weighed sixteen ounces; I was obliged to extend the incision in perineo to the sacro sciatic ligaments, and

when I seized the stone with the largest forceps, I found I could not extract it; I therefore endeavoured to bore a hole in it with a gimlet, as I held it between the blades of the forceps, but scarcely made any impression upon it: at last I succeeded in removing it in the following manner: Mr. David Babington, son of Dr. Babington, then my apprentice (a most amiable and excellent young man, who entirely fell a victim to his professional zeal, and who, if he had lived, promised to be one of the highest ornaments of his profession,) assisted me. I placed a single blade, or crotchet, on the upper part of the stone, under the symphysis pubis, and then, whilst I pulled the stone with the forceps through the opening in perineo, Mr. B. pressed down the stone by elevating the handle of the crotchet, and thus brought it below the line of the symphysis pubis, and thus it was extracted. The time occupied by the operation was nearly an hour, and the patient survived only a few hours.

*Forceps with blades which separate.*—For extracting very large calculi, a free incision is required, and the forceps must be large and strong. Mr. Cline had some made so that the blades could be introduced singly and joined together afterwards; or one blade could be used alone, as above described.

*Instrument to break large stones.*—Forceps have been constructed with teeth, to break a large stone; and Mr. Earle has invented a perforator for the same purpose: such an instrument, easily applied, is in the highest degree desirable.

*Soft stones.*—Soft stones create a difficulty in the operation, by rendering it necessary to remove the stone in fragments. It is thought to be very desirable afterwards to wash out the bladder by means of a syringe, with a view to prevent the future formation on any remaining portion. I believe it is better to use the scoop, and to remove with it all the particles of stone which the urine cannot carry off, as sand; for injecting the bladder will not remove fragments, and the after-flow of urine through the wound will remove sand.

*Unnecessarily broken.*—Stones are often broken which might be removed whole, if the surgeon were less violent, and more cautious. The mode of preventing them from breaking is, when the stone has been seized with the forceps, to put the thumb between the handles, so as to prevent them violently approximating, and to limit the degree of pressure.

*Number of stones.*—A number of calculi render the operation more tedious, but not so dangerous as one large stone. It is not the number of times that the forceps are introduced, but the violence used with them, which endangers the patient. When there are several in the bladder, care must be taken that none be left; and the surgeon must not be content with examining by the forceps only, but it is best to pass a sound into the bladder, either by the urethra or by the wound, to feel if any remain; he should also pass his finger into the rectum and raise the prostatic part of the bladder, so as to throw any stone lodged there into the axis of the

bladder; as it often happens that the prostate gland is enlarged when several stones exist, and they are generally situated behind this enlargement.

*Calculi not always detected.*—In the instances of the greatest number of calculi which I have seen, it was doubted for a length of time if any existed; yet, in one case, the urine had been repeatedly drawn off, and in the other the patient had been several times sounded, but a stone could not be felt:—on examination, after the patient's death, fifty-six stones were found in the bladder.

*Form of the stone.*—The form of the stone sometimes adds to the difficulty of its extraction; if its long axis much exceeds its breadth, when seized by the forceps in the centre it will not pass the opening in the bladder, from its extremities projecting on each side of the forceps: the surgeon, finding great resistance, should withdraw the forceps, and passing his finger into the bladder, he should turn the stone, and place its long axis from the fundus to the cervix, after which it can be easily extracted.

*Sacculi enclosing stones.*—Sacculi in the bladder sometimes enclose stones so far, that only the end projects into its natural cavity, and can be alone felt by the forceps. In my own practice I have met with only one decided case of this kind, which was the following:

*Case.*—A boy was admitted into Guy's Hospital, in whose bladder, by sounding, I found a stone; but the symptoms were less urgent than usual, and each time I sounded the stone was felt in the same part of the bladder. This led me to examine per rectum, and I then perceived a stone lodged and fixed at the under part of the bladder over the rectum, I therefore made an incision between the bladder and rectum in perineo, and, directed by my finger in the rectum, I reached the stone without wounding either the rectum or bladder; I then opened the sac with the knife, and seizing the stone with a pair of dressing forceps, I extracted it. The boy for three days only passed his urine by the wound, and then it took its natural course, and the wound healed rapidly.

*Case.*—In a case which I attended with Mr. James, surgeon, at Croydon, he found, on inspection of the body after death, two calculi, having large extremities connected by a narrow stem, one extremity of each was situated in a sac, and the other extremity in the cavity of the bladder.

As I have stated, a sacculus behind an enlarged prostate gland is a frequent occurrence, but the calculi are only occasionally falling into its cavity.

*Corpulency.*—Corpulency greatly increases the danger of the operation, as well as its difficulty. The perineum is often so deep as to render it impossible to reach the bladder with the finger; and if the stone be large, the impediments to its extraction are greatly augmented, by the resistance offered by the perineum.

*Prolapsus ani.*—When a child has been long subject to prolapsus ani, it often becomes troublesome at the time of the operation.



The anus should be supported by an assistant at the time the surgeon commences the operation, or it protrudes whilst he is making his incision. It may be observed, that in cases in which the prolapsus happens after opening the bladder, that if the instruments be withdrawn, they cannot again be introduced until the prolapsus be returned.

#### OF THE CAUSES OF DEATH FROM THE OPERATION.

The causes of death from lithotomy which I have witnessed are:

*Nervous irritability in children.*—1st, Nervous irritability occurring in very young persons: they are generally pale and almost comatose on the day after the operation: on the day following, their eyes roll quickly, and there is excessive restlessness; they then become extremely weak, are convulsed, and expire. To relieve this irritable state, calomel and opium are the best remedies.

*Peritoneal inflammation.*—2dly, Peritoneal inflammation, occurring when much violence has been used in extracting the stone.

The symptoms are; vomiting, tenderness in the region of the bladder, tension of the abdomen, and difficulty in procuring motions.

The treatment consists in administering calomel purges, in applying fomentations, leeches, and blisters to the abdomen; in bleeding from the arm, and the use of the warm bath.

In inspecting these cases, I have seen not only inflammation of the bladder and peritoneum, but extravasation of blood between the bladder, pubes, and abdominal muscles, showing that the bladder had been drawn down during the extraction of the stone. The removal of a large stone, when the prostate gland is enlarged, kills in the same manner.

*Hæmorrhage.*—3dly, Hæmorrhage. This I have seen repeatedly destroy life, and it has been with no small degree of surprise that I have heard it denied to be a cause of death.

*Case.*—I cut a man in Guy's Hospital at one o'clock in the day; the operation was soon over, and apparently under the happiest auspices; the patient was put to bed, and I soon after quitted the Hospital. In the afternoon the man became faint and vomited several times. At nine o'clock in the evening the sister of the ward, in turning down the bed-clothes, found the lower part of his body surrounded with blood, and the man was extremely faint. Mr. Callaway, my apprentice, was sent for, but the patient died in an hour.

A surgeon should not quit his patient until the bleeding caused by the operation has ceased: the patient should not be put to bed whilst any hæmorrhage continues; and when in bed he should be very lightly covered for some time.

I find that bleeding more frequently occurs when the gorget is passed obliquely, in the direction of the external wound, than when it is passed horizontally.

*Gangrene of the scrotum.*—4thly, Gangrene of the scrotum. This I have seen several times, in persons who have been of intemperate habits, or in those extremely weakened by age.

*Extravasation of urine.*—5thly, Extravasation of urine into the scrotum, producing great inflammation and swelling, and leading to gangrene; it arises from the incision being made too high, so as to open the cellular tissue of the scrotum.

*Scrotum to be supported.*—After the operation of lithotomy, the scrotum should be always supported by a bandage, to prevent the urine which flows through the wound, from irritating it, and thus the disposition to gangrene is lessened.

*Ulceration of the bladder.*—6thly, An ulcerated state of the bladder, shown by offensive urine, evacuation of mucus and of pus, mixed with blood, in some, are sufficient to lead to a fatal issue in lithotomy.

*Diseased kidney.*—7thly, Diseased kidneys, whether inflamed, wasted, suppurating, ulcerated, or containing stones; marked by pain in the loins, by purulent discharge, and by a disordered stomach.

*Visceral disease.*—8thly, Visceral disease, as a morbid state of the liver; dyspnoea from some chronic affection of the lungs; palpitation of the heart; irregular or intermitting pulse; which tend to destroy the powers of restoration.

#### OF THE AFTER-TREATMENT.

When the operation is concluded the patient is unbound; but the legs should not be immediately brought together if any bleeding continue, as the blood is apt to pass back into the bladder, where it coagulates; and producing great urgency to make water, the coagulum is forced out, occasioning a renewal of the hæmorrhage.

*To be kept dry.*—No dressing is to be applied to the wound, but a folded sheet or napkin is to be placed under the nates of the patient in bed, and this should be frequently examined, to ascertain if the urine be secreted and pass away: it should be changed for a dry one whenever it becomes wet.

*Opium.*—Opium may be given, if the patient be very irritable; but as it is apt to check the action of the intestines it should not be administered unless absolutely necessary.

*Diluents.*—The patient should be allowed to take diluents freely at first; such as linseed tea, or barley water with gum acacia in it; and, when the danger of inflammation has passed, beef tea, broth, or gruel may be given.

Saline medicines, with excess of alkali, are useful; if a tendency to fever or inflammation arises, purge the patient with castor oil, and foment the abdomen; if it increase give calomel and antimony, and occasionally castor oil; if the pain in the abdomen become

severe, bleed from the arm of the adult, and apply leeches to the abdomen of a child.

*Tying the legs together.*—When the wound begins to granulate, and not before, tie the legs together; as much mischief arises from doing so, soon after the operation; 1st, in bleeding, as already mentioned; 2dly, it prevents the free escape of the urine; it is of no use until the wound be disposed to close.

*Position.*—It is not necessary that the patient should rest on his back only; there is not any danger in his turning to the side, and great relief is often obtained by it.

*Passage of the urine.*—The urine passes, in some cases, entirely by the urethra in the first few hours, but this is not desirable; the patient suffers less in its discharge, and has less local irritation, if it escapes easily by the wound. In cases of enlarged prostate gland, it is proper to introduce a flexible catheter by the urethra, to permit the urine constantly to flow off. When the urine, under the common consequences of the operation, takes its natural course, the patient frequently suffers from a rigor.

*Recovery.*—Children usually recover from the operation in about three weeks, and adults in about a month; sometimes both have the wound healed within a shorter period.

*Evils following the operation.*—I have known two evils arise from the operation; one, a loss of the power of the retention of urine, when the patient is obliged to wear a yoke, or jugum; the other, an interruption to the passage of the semen, from some injury done to the veru montanum, where the united ducts of the vesiculæ seminales and vasa deferentia terminate.

*Case.*—A gentleman, I know, who has undergone this operation, has pain in coitu, but does not pass any semen, although he experiences the orgasm.

The patient's digestion and state of urine require to be attended to after the operation, to prevent a return of the disease.

Mr. Key, surgeon of Guy's Hospital, performs the operation of lithotomy in a different manner from that usually adopted. The points in which it differs from that commonly performed consist in the employment of a staff, nearly straight, and a scalpel-formed knife, which serves both for the external incision and for the division of the prostate gland, thus obviating the necessity for a change of instruments. The staff is slightly curved for about an inch from its extremity, to enable it to pass more easily over the prostate gland, and the knife is about twice the length of a common scalpel. The mode of performing the operation is as follows: the patient being secured, and the staff introduced into the bladder, an assistant is to hold the handle of the instrument inclined somewhat toward the operator, in order to keep its extremity projecting some way into the base of the bladder. The staff having been fairly laid open by the usual free external incision, and the point of the knife being steadily pressed against the groove, the operator takes the handle of the staff in his left hand, and lowers it till he feels his



hand checked by the ligament of the pubic arch. In this movement of the staff, the prostate is raised from the rectum, the ligament of the arch acting the part of a fulcrum, and the staff that of a lever, by which the gut is put out of danger of being wounded. The groove of the staff and the edge of the knife are then to be turned, by an easy, simultaneous movement of both hands, in the direction most favourable for the free division of the prostate, which will be about an angle of  $50^{\circ}$  with the horizon. The knife is now to be carried gently along the groove through the prostate into the bladder, until the gland is completely divided, which the operator easily ascertains, by the resistance offered to the knife ceasing.

In passing the knife, to complete the section of the prostate, its handle should be lowered to the bottom of the external incision, by which a sufficiently large angle is formed between the knife and staff, and thus an opening in the gland is made, large enough to admit the extraction of a moderate sized stone. When the stone is of unusual dimensions, or the prostate increased in size, it will be advisable to dilate the opening in withdrawing the knife, in the same manner as when the beaked knife is used: in common cases the knife may be withdrawn along the groove of the staff without the necessity of dilating.\*

#### OF THE HIGH OPERATION, OR THAT ABOVE THE PUBES.

*Not successful.*—Attempts have been made to revive this operation, in this country and in France; but in England, hitherto, they have been very unsuccessful.

\* As far as my own experience goes, I think the knife a much better instrument to divide the prostate with than the gorget; more violence is necessary to introduce the latter, and the opening made by it is limited to the width of the instrument: so that if a large stone be found much force is required to extract it, or the opening must be enlarged. With the knife, the surgeon may at once make a free incision through the prostate, which I consider a great advantage, as laceration or bruising of this part, by violence used in extracting the stone, is the most frequent cause of subsequent inflammation.

I have always made use of a long slender knife, with a probed extremity, of the same form as that mentioned by Sir Astley. During the early part of my apprenticeship to Sir A. C. he always used this instrument; and the success of his operations, performed with it, was greater than that which attended the employment of the gorget during the latter period of my time.

The probed extremity prevents the danger of wounding the posterior part of the bladder, supposing it to be in an empty and contracted state at the time the knife be introduced, which might happen with an instrument having a sharp extremity.

I have had an opportunity of using this knife in one case, in which great enlargement of the prostate existed; I did not find any difficulty in dividing the prostate; the operation was tedious on account of the stone being soft, so that I was obliged to extract it in pieces; but the patient, who was 73 years of age, perfectly recovered.

Out of nine other cases, in which I have used the probed knife, one only has terminated fatally: most of these patients were young, and otherwise healthy.

The blade of the knife, which I used in the case of enlarged prostate, was longer than that usually employed.—T.

*Preferable under peculiar circumstances.*—Those who have witnessed the general safety and facility in performing the lateral operation will never make use of the high operation, but under peculiar circumstances; as when the prostate gland is very much enlarged, or when a stone of great size exists. My opinion is, that it should be confined to a combination of these two circumstances (viz. the large stone and large prostate,) which render the operation in perineo very unsuccessful. Those who wish to be fully informed on this subject will consult the work of Mr. Carpue, who has taken great and very laudable pains to explain this operation.

#### OF REMOVING STONES FROM THE BLADDER BY THE URETHRO-VESICAL FORCEPS.\*

*Number of calculi.*—When a great number of calculi are found in the bladder, there is generally an enlargement of the prostate gland, and a sacculus formed in the bladder directly behind it. In these cases the bladder is rarely emptied completely of its fluid contents, and calculi form from the urine retained in the sac.

*Usually small.*—Such stones do not in general acquire the magnitude of those formed under the usual circumstances; and from their number and friction against each other, their surfaces are generally smooth, and their shape rounded. Fifty-six such calculi were found in the bladder of Mr. Perkins, the Brewer, who died from retention of urine.

*Sometimes passed with the urine.*—Persons who labour under this form of the disease sometimes pass the smaller of the calculi whilst making water; but the larger still remain, producing retention of urine, and the operation of lithotomy has often been performed for them; but, as the following cases will prove, they may be extracted from the bladder by means which do not expose the patient to any loss of blood, do not occasion the slightest danger, or any very considerable degree of suffering.

I am fully aware of the impossibility of extracting large urinary calculi by the means which are here recommended; yet I cannot but feel a hope that they may be removed, in the early stages of the disease, by the following means, before they acquire a bulk too large to pass by the urethra.

In the infant also, it will be extremely difficult to contrive an instrument of sufficient delicacy to be introduced into the bladder through the urethra, which shall possess such a degree of strength as to enable it to grasp the stone firmly, and to extract it with safety.

*Instrument for extracting small stones.*—The instrument which I first had made for the purpose of removing these calculi, was merely a common pair of forceps, made of the size of a sound, and

\* These observations and cases have been already published in the *Medico-Chirurgical Transactions*, vols. xi. and xii.

similarly curved; but Mr. Weiss, surgeons' instrument maker in the Strand, showed me a pair of bullet forceps, which he thought would, with a little alteration, better answer the purpose I had in view. He removed two of the blades of these forceps (for there were four,) and gave them the form of the instrument which I had constructed; the blades of this instrument could be opened whilst in the bladder, by means of a stilette, so as to grasp and confine the stone; it gave but little pain on its introduction, but when opened to its greatest extent, and stones were admitted between its blades, their removal was painful, more particularly at the glans penis, which appears to be the portion of the urethra furnishing the greatest resistance to their removal.

I shall now proceed to detail the circumstances of the first case, as they have been related by the patient himself.

*Case, as related by the Rev. Mr. Bullen.*

The Rev. John Bullen, of Barnwell, near Cambridge, aged 64, of a spare habit of body and of a sanguine temperament, having enjoyed an uninterrupted state of good health, capable of partaking largely of the amusement of hunting, and living always with great moderation, was attacked, in May, 1818, with symptoms, of which he gives the following account:

"I was suddenly seized with a frequent inclination to pass my water, and an uneasy sensation along the course of the urethra, which continued with greater or less violence for about a fortnight, when I was surprised by the appearance of a small round white stone at the orifice of the passage. The escape of this small calculus, which was attended with scarcely any pain, failed to produce any beneficial effect on my former symptoms, which continued unabated, both as to the degree of irritation and the frequency of making water. In this state I remained till June following, during which month several similar calculi passed, to the number of about thirty, producing no other inconvenience than a slight smarting pain along the urethra. At the end of June, without any assignable cause, I was suddenly relieved from this discharge of calculous matter, and from every other symptom but that of a frequent desire to void my urine, which latter inconvenience occasioned me no feelings of anxiety or apprehension.

"In the ensuing winter, I was seized with pains across the back and loins; for which Mr. Brewster, of Cambridge, supposing they proceeded from gravel, ordered me medicines, which he considered likely to alleviate them, but without producing any permanent good effect.

"I was, however, still enabled to pursue my favourite amusement of hunting, though frequently obliged to dismount to make water; at this time making no alteration from my accustomed mode of living.

"Without any material change I remained until the December



of 1819, when I found the exercise of riding was becoming considerably more painful, and the inclination to pass my water more frequent, attended with some degree of difficulty in its passage, and a change, from its usual colour and clearness, to a fluid resembling chocolate. For these symptoms several formulæ of medicines having been prescribed without any material benefit, I was induced to consult Mr. Abbott, a most respectable surgeon at Cambridge, who ordered me medicines highly beneficial in their first effects; the relief, however, they afforded me, was but of short duration, for my symptoms recurred with all their former violence; and though the prescriptions were repeatedly altered at Mr. Abbott's suggestion, no sensible impression could, by the most judicious treatment, be made on the disease.

"My friend, Dr. Thackeray, of Cambridge, was, in the June following, called in consultation with Mr. Abbott; and both agreeing that the symptoms were produced by stone in the bladder, the sound was introduced to ascertain its presence, but failed to discover it. My symptoms continuing unabated, Mr. Abbott, a fortnight afterwards, still impressed with the idea of stone, again sounded me; but the stones, for the reasons hereafter given, escaped detection. To relieve my frequent inclination to make water, and to mitigate the pain I experienced in its discharge, I was recommended the use of an opiate glyster at bed-time, which afforded me considerable relief; but if the injection were omitted but for a single night, the symptoms returned with all their former violence.

"In this state of suffering I determined to consult Mr. Astley Cooper, and on the 17th of August went to town for that purpose. Mr. Cooper, suspecting from my account that a stone was present in the bladder, sounded me; but after searching for some minutes was unable to detect one; he then directed me to discharge the water from my bladder, and the sound being again introduced was distinctly heard to strike upon a stone. He then informed me that there was no hope of permanent relief but from the operation of lithotomy; at the same time remarking that, as I had not been sufficiently reduced by the irritation of the disease to render me a favourable subject for the operation, it would be better for me to return to Cambridge, and by pursuing a certain plan of diet and regimen, to reduce the high health which I appeared to possess. He also prescribed alkaline medicine, for the purpose of lessening irritation. With this advice I returned home, where I remained till October, 1820, pursuing the use of the soda and the opiate injection. My sufferings being alleviated only for the moment, and seeing no probability of experiencing further relief from medicine; on the 23d of October I came to London to submit myself to the operation, and the 30th was the day proposed for its performance.

"On the day appointed, Mr. Cooper, his nephew, Mr. B. Cooper, and Mr. Merriman, junr. attended at my house. Upon sounding me, the instrument could be distinctly heard by every person

present and even by myself, to strike against a stone. Mr. Cooper, however, was of opinion that the stone was so small, as to admit of extraction without cutting into the bladder; and, therefore, determined not to perform the operation, but told me that he would try less dangerous means to rid me of this complaint; and happily under these circumstances the operation was deferred.

"On the 3d of November, I called at Mr. Cooper's house, when he passed a full sized bougie into the bladder, for the purpose, as he said, of dilating the urethra, and thus giving the stone an opportunity of passing with the flow of urine. This operation was repeated on the 6th, 10th, and 13th of November; but on the 14th an inflammation took place in the prostate gland, from the introduction of the bougies, and put a stop to the prosecution of this plan of treatment. The effect of this inflammation was a retention of urine, rendering it necessary for Mr. Cooper to draw off my water every twenty-four hours; at which time the calculus could always be distinctly felt by the catheter. After the inflammation had subsided, the power of making water not having returned, Mr. Cooper passed an elastic catheter into my bladder, and directed me to wear it; teaching me, at the same time, how to withdraw it when it became either painful or obstructed; and, on several occasions, I discovered small white stones in the opening of the instrument similar to those which had passed in 1818. Mr. Cooper, upon being acquainted with this circumstance, expressed a wish to remove the instrument himself; when, upon withdrawing it, a stone was seen large enough to fill the opening in the side of the elastic catheter. The passage of these calculi suggested to Mr. Cooper the possibility of inventing an instrument by which he might remove those that remained in the bladder; and on the 23d of November he brought with him some instruments contrived for the purpose; one of which he directly employed, and was so fortunate in the first trial as to remove eight calculi of small size. The operation was productive of a very inconsiderable degree of pain.

"On the 28th, eight more were removed by the same means, of a larger size than the former, two being as big as horse-beans. This operation was attended with even less pain than the former.

"On the 30th eleven were extracted; three or four being engaged each time the instrument was withdrawn. The removal of these gave me great relief, for I was immediately enabled to pass a considerable quantity of urine by my natural efforts; and previously to this, ever since the large bougie had been introduced, I had been unable to pass my water without the aid of the catheter.

"On the 8th of December six stones were removed by the same means.

"On the 13th, nine more were taken away.

"On the 19th, three more were extracted.

"On the 23d, twelve more were removed; thus only allowing the intermission of a day or two for the irritation to go off. The operations were repeated until eighty-four calculi were, by these

means, extracted from my bladder; when Mr. Cooper pronounced, after a most careful examination, they were all removed. My health has been all this time uninterruptedly good, with the exception of the attack of retention of urine from the use of the large bougie; and I am now able to discharge my urine without the use of the catheter, and to walk nearly as well as I ever did."

The following case is, in part, detailed from the patient's account of his symptoms; and, in part, from the statement of Sir Gilbert Blane, who is the patient's physician.

*Sir William Bellingham's Account of his Case.*

"Sir William B—— is in his 67th year; he suffered much at times from long and severe attacks of gout, from about his 55th to his 60th year; since which period the attacks have been much less frequent, much mitigated, and of short continuance. He thinks he first perceived red gravel or sand to come from him occasionally, soon after a long fit of the gout about seven or eight years since, but did not suffer much inconvenience from it. About four years since, he passed pieces of gravel at different times, and has continued occasionally to do so ever since; sometimes larger than a pea, but generally of an oblong shape. When they occasioned any stoppage in the passage, he used a hot bath at 94° and drank plentifully of some diluting drink, which, after a little time, relieved him. In the summer of the year 1820, having had occasion to use a great deal of walking exercise in London; for three or four days he was much surprised on passing, first, a considerable quantity of very dark stuff, nearly like coffee grounds; and afterwards a considerable quantity of, what appeared chiefly, blood. He did not experience any pain of consequence with this; and by the following day his urine was as clear as before. Upon going into the country, he found that if he rode fast at any time, it brought on the passing of the dark stuff, and afterwards, if persisted in, of blood. By degrees he gave up riding, and finally ceased to ride about Christmas last; and finding the same effects to arise in a slighter degree from walking much, he has very nearly given up that also, for the last six months. Sir Astley Cooper and Sir Gilbert Blane attended him for these symptoms, in June and July, 1821, when he left London for Ireland; whilst there, he continued to experience the same inconvenience as before, with but little pain, and the same on his return to London. Early in June last, he called on Sir Astley Cooper to say he was going again to Ireland, and wished to have some conversation with him, when Sir Astley Cooper advised his being sounded; which he then was, and it was ascertained that there was a stone. As it appeared, to Sir Astley Cooper, to be a small one, he proposed trying to extract it; and on the fourth trial, with intervals of a week or so between them, a stone weighing seventeen grains and a half was extracted on the 18th of July. About three weeks after, Sir William, having some



fears that there still remained some stone behind, again applied to Sir Astley Cooper, who upon sounding found that such was the case; and on making at that time at his house an attempt to extract, he brought it part of the way, but found it too large to bring forward, and therefore returned it; and, as soon after as the parts would permit, he commenced enlarging the passage by bougies, which he continued at intervals for nearly a fortnight, and then extracted a stone weighing fifty-four grains, on the 28th of August 1822."

Sir William B. suffered pain in making water; swelling of the corpus spongiosum at the scrotum, with considerable urethral discharge, until September 23d, when the symptoms subsided, under the application of fomentations and poultices.

When the size of the stone is observed, it will not excite surprise that I had considerable difficulty in extracting the larger, which weighed fifty-four grains. It was in that part of the urethra near the glans that the chief impediment was found; and, if I had thought proper to do so, I could have easily removed it from thence by incision, but I preferred completing the extraction without occasioning a wound. Yet I am now disposed to believe, that in a stone of equal magnitude, it would be better to make a small incision into the urethra, anteriorly to the scrotum, than employ force for the extraction of the stone through this narrower part of the urethra.

A. C.

### *Mr. King's Case.*

Mr. William King, aged 66, mariner, residing at Rochester, was sent to me by Mr. Newsom, surgeon, of Rochester, on account of his having symptoms of the stone.

He came to London on the 29th of October, 1822, and on the 30th he visited me. I sounded him, and found that he had, as Mr. Newsom supposed, calculi in the bladder. I passed the urethral forceps into the bladder, and in a few minutes extracted four calculi; and although I could still perceive that some remained in the bladder, I did not choose to risk the production of any considerable degree of irritation; but advised him to come on November 1st, to have the operation repeated.

On the 1st of November I extracted three calculi; on the 4th, five more; on the 7th, twelve calculi; on the 11th, two; and on the 13th, three more. I then examined the bladder with care, but could not perceive any more stones; and, even before the removal of the last, he had experienced considerable diminution of the pain in making water, and of the difficulty in passing it.

It is delightful to hear the expressions of gratitude which this patient pours forth for the relief which he has experienced from these operations, under which he has suffered but a slight degree of pain, and has never for a moment been confined from whatever exercise he was disposed to take.

Some years ago he passed red sand (uric acid;) but for several months before he had symptoms of the stone, he had not perceived any.

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*Case.*—I have lately removed from a young person (a patient of Mr. Rutherford, in Ratcliffe Highway,) of the name of Errington, a calculus of moderate size, and enabled two others to pass, by withdrawing the instrument in its dilated state, and thus extending the urethra in such a degree, that the stones passed in the afternoon of the same day in a copious discharge of the urine.

I have heard that it has been stated, that there was no novelty either in this idea or in the instrument. To this I have only to observe, that if the idea had previously occurred to any individual, he had so far buried it in his bosom that I had never heard of it; and, as to the instrument, I am quite sure that Mr. Weiss consulted no musty volume for its formation; for, so soon as I mentioned my wish, that he should construct a pair of forceps by dividing a sound in its middle, and giving it a joint two inches from its end, he, without quitting me, observed that he should make them to open, in the mode in which he now makes them. Mr. Weiss has a strong and ingenious mind, and does not use petty artifices to obtain employment or character. But let us for a moment suppose (what I do not believe) that the idea had occurred to others, and the instrument had been made centuries ago, what are we to say of the apathy of those bright ornaments of their profession, Cheselden, Pott, Hunter, Cline, Home, Blizard, &c. who, if they had heard of such an instrument, had never employed it?

#### OF BREAKING OR SAWING STONES IN THE BLADDER.

An instrument for the purpose of breaking stones in the bladder (called lithontripteur) has been invented; and, during the last year, successfully employed in Paris, by Mons. Civiale.

A description of the instrument, of the mode of using it, and an account of three cases in which it has succeeded, have been published from a Report of the Royal Academy of Sciences.

The size and straight form of the lithontripteur render it only applicable to peculiar cases. The urethra must have acquired its full growth, and the prostate gland must be in a healthy state, or the instrument cannot be employed with safety: even then the urethra must, in most cases, be gradually dilated by the passage of bougies, before the operation can be performed. When introduced into the bladder, the lithontripteur is not calculated to seize a large stone, as the claws or holders do not separate to a sufficient width to grasp it, which cannot be remedied unless the size of the instrument be increased, or the springs weakened.

The lithontripteur is therefore only adapted to the case of an

adult, having a sound state of urethra and prostate, provided the calculus be also of a moderate size.

This instrument has not as yet been successfully employed in this country.

Mr. Weiss, whose name I have already had occasion to mention, has made an instrument, which is well calculated to break stones of small size, and of not very hard consistence: it is on the same plan as the urethro-vesical forceps, but having strong springs. He is now engaged in perfecting an instrument, which will divide a stone into minute pieces by means of a saw.

### OF CALCULI IN THE URETHRA.

They may be best described in the three situations in which the surgeon is called upon to aid their passage, or to remove them by operation; viz. 1st, in the membranous part of the urethra; 2dly, above the scrotum; 3dly, opposite the frænum.

*In the membranous part.*—If you are consulted on account of a stone being arrested in its progress at the membranous portion of the canal, you find the patient having the strongest desire to void his urine; but able only to pass a few drops, with dreadful agony. You introduce a catheter into the membranous part of the urethra, and, feeling a stone grate against its extremity, you should immediately withdraw it, and pass a bougie as large as the passage will admit; when this touches the stone it should be left in, and the patient should be directed to sit in water as hot as he can bear it, and continue it as long as he can: at the same time he should take opium with small doses of tartarized antimony. In half an hour, or an hour, withdraw the bougie, whilst the patient tries to make water, when the stone will frequently follow the bougie, being forced from him by the *vis-a-tergo*. I have found this plan to be most successful.

*Operation to extract the calculus.*—If the stone permanently lodges in the membranous portion of the urethra, pass a catheter down to it, and introduce a finger into the rectum, to press upon the canal behind the stone, so as to prevent any retrograde movement of it towards the bladder; then make an incision in perineo upon the calculus, and extract it with the common dressing forceps.

*Stone behind the scrotum.*—If the stone be placed in the urethra above the scrotum, try to press it forwards with the fingers, until it be brought before the scrotum; if this cannot be effected it must be pushed back behind the scrotum, and there cut upon, if the use of the large bougie, as in the former case, is not successful.

*Scrotum must not be opened.*—Do not cut through the scrotum to remove a calculus until all other means have been tried; and if it be at all necessary, which I doubt, let the external opening be free, so as to allow of a ready escape for the urine, and thereby prevent its extravasation into the cellular tissue, which would produce extensive inflammation and suppuration. A catheter should be intro-



duced into the bladder after the operation, and left there, that the urine may flow through it during the time the wound is healing.

*Stone near the glans.*—If the stone be situated near the glans, the surgeon should try to press it through the meatus; but if he cannot accomplish this, he should introduce a common probe, curved at its end, behind the stone, and draw it forwards.

Forceps cannot be introduced effectually, because they open in the urethra before the stone, but cannot be passed over it.

*Meatus to be enlarged.*—It is better to enlarge the meatus with a lancet, to free the passage of the stone, rather than risk the laceration of the parts from violence.

*Preparations in the Museum at St. Thomas's Hospital.*—In the collection at St. Thomas's Hospital I have two preparations, showing calculi which have ulcerated their way into the urethra. One, a stone of the form and size of the little finger, and slightly curved, which I cut from a young man who had a fistula in perineo: with a probe I felt the end of a calculus through the fistulous opening, and therefore made an incision and extracted it; its anterior extremity was in the membranous portion of the urethra, its posterior in the bladder. In the other preparation, the stones are seen partly in the prostatic part of the urethra, passing there by ulceration. I have twice known a stone in the urethra destroy life by occasioning an extravasation of urine into the scrotum.

## LECTURE XXIV.

### OF CALCULI IN THE PROSTATE GLAND.

I SEPARATE these from urinary calculi, because they are formed independent of that secretion, and they differ generally in their component materials from urinary calculi.

*Found in two situations.*—I have found them in two situations in the prostate: 1st, several calculi, each seated in a separate small duct; 2dly, numerous calculi placed together in a cyst or bag in the substance of the gland.

*Do not acquire a large size.*—They rarely acquire any considerable size; the largest I have seen not being bigger than a pea, and they seldom are so large; but their numbers are sometimes very considerable.

*Case.*—I was called by Mr. George Vaux, to see a Mr. Lewis, in the Old Jewry, who had retention of urine, and in whom there was difficulty in passing the catheter. As the instrument entered the bladder through the prostate gland, it grated over a stone. I passed my finger per rectum, and felt two or three calculi grating against each other, and I endeavoured to persuade him to let me extract them, but he would not consent. He died of diseased kid-

neys, and I have his prostate gland, containing the calculi, in the collection at St. Thomas's Hospital.

*Case.*—The second case was that of general B——, whom I cut for the stone in his bladder: I removed many calculi, some of which were prostatic and some urinary. The surgeon who had attended the general previously, had observed that a bougie, which he had introduced into the bladder, was marked by the calculi. The patient recovered.

*Case.*—I operated on a patient of Mr. Forbes, surgeon at Camberwell, and removed an immense number of prostatic calculi. These calculi had produced not only painful feelings in the perineum, but a degree of irritation, which kept the patient in continual mental excitement, bordering upon insanity. I introduced a staff into the bladder through the urethra, and opened the perineum as far as the prostate, cutting into the urethra, as in the operation for lithotomy; I then made an incision into the left lateral lobe, and extracted many calculi from a bag formed in it. The patient bore the operation well, but did not perfectly recover; a fistulous opening remained, and his symptoms became as distressing as before. On examining by the fistulous opening, I could distinctly feel more calculi, although I could not discover them by introducing my finger per rectum. The sufferings of the patient induced me, about six months after the first operation, to perform a second, which I accomplished by passing a director into the fistulous opening, and then enlarging this opening by a bistoury: I extracted about half as many calculi as in the first operation. The patient soon recovered from the effects of this second operation, and the wound closed entirely; but, after a short time, his sufferings became as dreadful as before, and, believing that he could not procure any relief, he destroyed himself six months after the second operation.

The operation is not difficult, and is certainly not dangerous. If the calculi are in a single cyst, a single operation will produce complete relief; but if more than one cavity exist, other operations will be required.

These calculi are composed of phosphate of lime.

#### OF CALCULUS IN THE FEMALE.

*Operation seldom necessary.*—Lithotomy is much less frequently required in the female than in the male, probably on account of the meatus readily permitting the escape of materials which would have become the nuclei of stones in the male, be they portions of gravel, of blood, inspissated mucus, or extraneous bodies.

*Symptoms.*—When the female labours under calculus, her sufferings are more severe even than those which the male experiences from this disease; at first the symptoms are of the same kind, as urgency to make water, and frequent inclination to do so; sudden stoppage to the flow of the urine; pain at the end of the

urinary passage; and blood occasionally mixed with the urine. In addition to these symptoms, as the irritability of the bladder increases, the pain during micturition is excessive, and there is agonizing suffering after the discharge of the urine, from a bearing down of the bladder, uterus, and rectum, with a sensation of their being forced through the lower opening of the pelvis. The retention of urine becomes imperfect, and the person is always wet, and smells offensively of urine. The sufferings of the patient at length render her incapable of moving from her bed.

The calculus is usually lodged in the bladder, as in the male; but I have once seen a case in which the stone was placed half in the urethra and half in the vagina; the extremities of the stone were large, and connected by a narrow portion, which passed through an ulcerated opening in the under part of the urethra.

*Unnatural propensities in women.*—Women sometimes render themselves the subjects of lithotomy from perverse and unnatural propensities. I have known a female put a pebble into the meatus urinarius.

A lady in using a catheter for herself, broke it in the bladder, and I extracted it in the presence of Mr. Ilott, of Bromley.

I have known women introduce extraneous substances into the vagina, to invite the operation for the stone.

*Case.*—A girl, about twenty years of age, came to St. Thomas's Hospital, describing herself to suffer all the symptoms of the stone; she was placed upon the operating table, before all the students, and Mr. Cline passed a sound to ascertain the presence of the stone; he struck some solid body, and a person of less caution might have immediately proceeded with the operation; but he said, "I feel a solid body, which has not the hardness of stone;" he then examined by the vagina, and drew from thence a portion of coal, and afterwards several other pieces: she had no disease.

*Case.*—I cut a woman in Guy's Hospital for the stone, and found a large piece of a brass nail in her bladder, which is now in the collection at St. Thomas's Hospital.

*Stone formed on an extraneous body.*—In the female, a stone will form around an extraneous body, as in the male, of which the following is a curious instance:—a woman was the subject of retention of urine, and required the frequent introduction of the catheter: she was under the care of Mr. Castle, surgeon at Sittingbourne; and one of his assistants having passed the catheter, allowed it to escape from his fingers into the bladder, and there it remained for several months: she was then sent to Guy's Hospital, where I sounded her and felt the catheter. I opened the urethra freely with a knife, and passing my finger into the bladder, found the catheter placed transversely in it, and on its centre a large calculus with each end free from such accumulation. I then brought down one end of the catheter to the meatus, with my finger, and thus removed it. The calculous deposit on the instrument weighed at least an ounce.



*Large stones may pass the urethra.*—Very large calculi can pass by the meatus. Mr. Giraud gave one of more than an ounce weight, which a woman had passed with her urine.

*Medical treatment.*—The same medical treatment is proper in the female as has been recommended in the male, to lessen the patient's sufferings. It might be thought that solvents could with advantage be injected, but the patients cannot bear them, and will not submit to their use, as they irritate excessively. Opium may be injected, or a suppository be introduced; but they only relieve for a very short period.

*Calculi extracted without cutting.*—Stones of large size may be extracted from the female without the use of cutting instruments. Mr. Thomas has related, in the *Medico-Chirurgical Transactions*, a case in which he dilated the meatus urinarius to extract an extraneous body from the bladder. Guided by this circumstance, I removed a calculus, having, by the use of sponge tent, dilated the meatus; and in another case, by the dilating forceps, I took away a portion of a catheter.

*Case.*—Dr. Nuttall and myself attending a case together, he objected to my mode of dilating the meatus, and thought that forceps with blades opening in parallel instead of divergent lines would be better. We walked together to Mr. Weiss, who, with his usual ingenuity, made a forceps upon that principle.

Unless a stone be extremely large, it should be removed by dilatation of the urethra, which may, by a speculum or pair of forceps, be opened sufficiently in a few minutes for this purpose. The advantage attending this mode of extracting a stone is, that the passage again contracts, and the urine is afterwards retained.

In the first case in which I performed this operation in Guy's Hospital, having used sponge tent, the patient perfectly recovered in a few days.

*Mode of operating with the knife.*—If the operation for lithotomy be required in the female, it should be performed in the following manner:—the patient having been bound in the same position as in the operation on the male; the sound is to be introduced (and it may be sometimes necessary to use a curved male sound, which Mr. Cline used to recommend,) in order to detect the calculus.

The stone being found, a straight staff is to be introduced when the sound has been withdrawn; and this the surgeon should hold in his left hand, with the groove turned to the left branch of the ischium: the beak of the straight bistoury is then to be passed along its groove into the bladder, so as to divide the meatus and urethra obliquely downwards and outwards on the left side, between the vagina and branch of the ischium. The finger may then be passed into the bladder, to ascertain the situation of the stone, after which the forceps are to be introduced and the stone extracted. The curved forceps are sometimes necessary on account of the capacity of the bladder, and the usual position of the calculus,

which rests behind the neck of the bladder, over the posterior and upper part of the vagina.

*Large stones difficult to extract.*—A large stone is with difficulty extracted from the female, on account of the proximity of the meatus and pubes.

*Operation causes incontinence.*—In all cases of this operation which I have performed or witnessed, the urine has not been afterwards retained; but I would not deny that a patient might recover the retentive power.

As the loss of retention is a greater evil than I can describe, producing excoriation, and a very offensive state, I shall, in any future operation of lithotomy, try what may be effected by employing a suture to bring the divided parts together.

#### OF CALCULI IN THE SUBMAXILLARY DUCT.

*Produce inconvenience.*—Stones forming in this duct produce considerable inconvenience, and the cause of the symptoms generally exists for some time before it is discovered.

*Case.*—When I was living with Mr. Cline, he used frequently to say “I have a spasm in my mylohyoideus muscle,” and it was usually at the time of eating that he made this observation: at length he said, “I have discovered the cause of the uneasiness and spasm under my tongue, it arises from a stone in the submaxillary duct,” which he desired me to feel, and which I removed from him in the manner I shall presently describe.

*Case.*—A medical man called upon me and said, “I have an irritation and swelling under my tongue; I have taken great quantities of blue pill; but as my health is becoming impaired, and the disease continues, I am advised to go to the coast.” On putting my finger under his tongue, I felt a calculus, which I immediately removed, and in a week he was well.

*Situation.*—These calculi are generally situated in the trunk of the duct, but sometimes in its branches within the substance of the gland.

*Size.*—The largest I have seen was the size of an almond deprived of its shell; I have seen one fluted so as to allow of the passage of the saliva through the depression.

*Composition.*—They are composed of phosphate of lime.

*Operation to extract them.*—The operation for their removal is to be performed as follows:—the cheek is drawn back by means of a blunt hook introduced at the angle of the mouth; the duct is pressed upwards by the finger of an assistant, placed under the lower jaw: an incision is then made, with a pointed and curved bistory, upon the stone from under the tongue, within the mouth, so as to divide the lining membrane of the mouth and open the submaxillary duct; the stone being exposed is to be brought from its situation by means of a small hook which is to be passed under it. If the stone be deep seated in the substance of the gland, a small pair of forceps are required to extract it.

## LECTURE XXV.

## OPERATIONS FOR RETENTION OF URINE.

It is not my intention, in the present Lecture, to enter into a detailed description of the causes which give rise to the retention of urine; but merely here to state them generally, and at a future time give a more particular account of each.

*Causes.*—The causes which I have known produce retention of urine in the male are:

1. A narrow orifice to the urethra.
2. A congenital obstruction in the urethra.
3. Permanent stricture.
4. Inflammatory stricture.
5. Spasmodic stricture.
6. Abscess or tumour pressing upon the urethra.
7. Stone in the urethra.
8. An enlargement of the prostate gland.
9. Paralysis of the bladder.
10. Chancres or other ulcers in the urethra, which, in healing, close it.

In the female:

1. Polypus of the vagina.
2. Polypus of the uterus.
3. Ovarian enlargement.
4. Retroversion of the uterus.
5. Loss of power from uterine affection, a species of hysteria.

*Consequences.*—From whatever cause the retention be produced, the bladder must be relieved of its load, or the patient will die from inflammation or gangrene, or perish from irritation.

*An operation necessary.*—If therefore a catheter cannot be introduced; if relaxation by bleeding, the warm bath, and antimony; if lulling the patient by opium, do not succeed in giving a passage to the water, an operation will be required to save the patient.

*Symptoms.*—Besides the dreadful pain and excessive irritation occasioned by the distention of the bladder, retention of urine is marked by a frequent urgency to make water, and swelling of the lower part of the abdomen, from the accumulation in the bladder; this swelling reaches as high as the navel, and on each side to the lineæ semilunares: the fluid accumulation can be distinctly felt through the abdominal parietes.

*Operation.*—The mode of relief which has been usually resorted to has been to puncture the bladder; but, in the male, it is not the operation which I perform, nor do I recommend it as a general practice; but as it may be occasionally required, I shall describe the different modes of puncture.

*Founded on anatomical knowledge.*—The operations of puncturing



the bladder are founded upon a knowledge of the reflexion of the peritoneum, which passes from the abdominal parietes above the pubes to the fundus of the bladder; and is continued to the back of the bladder, near to the prostate gland, and is then reflected to the fore part of the rectum.

Thus the cervix of the bladder and its fore part above and behind the pubes, also the posterior and inferior part behind the prostate gland as far as the entrance of the ureters are devoid of peritoneal covering.

#### OF THE PUNCTURE ABOVE THE PUBES.

When the bladder becomes excessively distended, its fundus rises towards the umbilicus, and carries with it the peritoneum, so that a considerable space is left above the pubes uncovered by this membrane, at which place a trocar may be easily introduced, without danger of wounding it.

This space is covered by the linea alba, in the centre, and at the sides by the pyramidales and recti muscles, the bladder being attached beneath by cellular tissue.

*Operation.*—The operation requires the following attentions.

1st, The patient is to be placed on a table, in the horizontal position, with his knees a little elevated.

2dly, The hair is to be removed from the pubes.

3dly, An incision, one inch in length, is to be made through the integument immediately above the pubes, in the direction of the linea alba.

4thly, A trocar and canula, of sufficient length, are passed through the opening in the skin, and then thrust through the linea alba, cellular tissue, and fore part of the bladder into its cavity.

5thly, The direction of the trocar should be to the basis of the sacrum, that is, a little upwards, and not directly downwards in a perpendicular line, as it may then pass between the bladder and pubes; and even if the instrument enters the bladder as the organ contracts it slips from the canula.

6thly, The trocar is to be withdrawn to allow the urine to escape through the canula.

7thly, A male flexible catheter is to be passed through the canula, cut to a proper length, so as to remain in the bladder, and it is to be secured so as to prevent its escape.

This operation is easy of performance, requiring little anatomical knowledge, and has therefore usually had the preference given to it.

*After-treatment.*—When the inflammation following the operation has subsided, when all danger from extravasation of urine into the cellular membrane has ceased, and the patient recovers his health, it is right to begin attempts to re-establish the urethra by the use of bougies, sounds, &c. and this may be generally effected.

*Case.*—I saw a man from Essex, below Malden, whose bladder had been successfully punctured by Dr. Hare, above the pubes, twelve months before, and who came to town to consult me, with a female catheter still remaining in the bladder, in the same opening at which the urine had been drawn off. I, after a time, succeeded in passing a catheter into his bladder through the urethra, the female catheter was removed, and he returned into the country with the wound above the pubes quite closed.

*Objection to the operation.*—An objection to this operation, formerly urged, was, that the canula remaining in the bladder produced irritation: this is obviated by the use of an elastic gum catheter, instead of the metallic one.

#### OF PUNCTURING THE BLADDER BY THE RECTUM.

*Bladder forms a projection into the rectum.*—When the bladder is greatly distended, and has not undergone any morbid change, it generally projects into the rectum; so that if the finger be introduced into the gut, a fluctuating swelling is felt just beyond the seat of the prostate gland.

When the prostate gland is enlarged, this part of the bladder is more remote from the anus and less accessible, although still within reach.

*Part to be punctured.*—Behind the prostate gland is a triangular space, bounded in the following manner:—on each side by the vasa deferentia and vesiculæ seminales meeting at the prostate; and the peritoneum is the boundary behind. In the centre of this space a trocar and canula may be passed through the fore part of the rectum, through the cellular tissue connecting it to the bladder, and through the coats of the latter into its cavity.

If the centre of the space be kept, there is no danger of wounding the vasa deferentia or vesiculæ seminales if the bladder be distended. The trocar may be safely introduced an inch behind the prostate without risk of injuring the peritoneum, and the vasa deferentia may be thus completely avoided, whereas a puncture near the gland might endanger them.

*Operation.*—The operation is to be thus performed:

1st, The patient is to be placed on a high table, so that the surgeon can sit lower than the patient.

2dly, The finger is to be passed per rectum to the projecting portion of the bladder behind the prostate.

3dly, A trocar and canula, three inches long, are to be passed upon the finger to the protruding part of the bladder, and forced through the fore part of the rectum and posterior part of the bladder into its cavity. A curved trocar has been advised and employed, but it is quite unnecessary if the silver canula be not suffered to remain.

4thly, The trocar is to be withdrawn, and a flexible gum catheter is to be passed through the canula into the bladder; the canula

is then to be removed, and the elastic catheter is to be confined to a T bandage, or to a tape passed between the thighs.

*After-treatment.*—When the patient has sufficiently recovered from the inflammation which the disease and operation have produced, it will be right to begin with re-establishing the urethra.

This operation is easily performed; but it is decidedly objectionable, on account of the urine being liable to produce a diseased state of the rectum.

Dr. Cheston, of Gloucester, told me that he had seen great disease of the intestine occasioned by it.

I was sent for to a patient who had undergone this operation for a retention of urine from a disease of the prostate gland. The bladder had been punctured just before my arrival, yet I easily passed a catheter into his bladder through the urethra. I mention this to show how little the operation was required, and that the enlarged gland did not prevent the introduction of the catheter.

#### OF THE OPERATION IN PERINEO.

The neck of the bladder around the prostate gland is devoid of peritoneum; and, excepting the posterior surface, where the vasa deferentia and vesiculæ seminales are seated, there is no important part which can be injured by a puncture.

*Requires anatomical knowledge.*—This operation requires more anatomical knowledge than the two which I have described; it is more difficult to perform, and much more care is required to preserve the opening into the bladder; yet, to a scientific surgeon, even this presents but little difficulty. Mr. Cline used always to advocate its performance.

*Operation.*—The steps of the operation are as follow:

1st, An incision is to be made in perineo, as in the operation for the stone, and it is to be carried to the bulb of the urethra, where it is covered by the accelerator urinæ.

2dly, The bulb is to be pressed by the finger to the patient's right side, and the incision is then carried onwards between the bulb and left crus of the penis, as far as the prostate gland.

3dly, The surgeon is to pass his finger into the wound as far as the left side of the prostate gland, so that it may serve as a guide to the canula and trocar.

4thly, The trocar and canula are to be pushed into the cavity of the bladder, by the left side of the gland.

5thly, The trocar being withdrawn, the canula is left in the bladder to allow of the escape of the urine.

6thly, Through the canula an elastic gum catheter is to be passed and secured, as in the former case.

*Subsequent treatment.*—When the patient has recovered sufficiently, the natural canal is to be opened by the use of a sound or bougie; and in all cases of considerable difficulty, when the urine



passes freely by the artificial opening, a caustic may be safely employed.

*Other modes of relief.*—Having described the different operations which are performed for the relief of a patient having retention of urine, I shall now proceed to point out the practice which I have myself pursued in these cases.

*Most frequent causes of retention.*—I must premise, that I consider, from the experience I have had in this disease, that nine tenths of the difficulties in passing the urine arises from strictures of the urethra, or from enlargement of the prostate gland: with respect to the latter, I have never yet seen a case in which I could not pass a catheter, made of proper form and size, although I do not wish to be understood to say, that there never can be such a case; but only, that in the course of a very extended experience I have never found an instance of it. I shall say more upon this subject when I speak of the diseases of the prostate gland; but shall now return to describe the mode of relieving retention from diseases of the urethra.

*Preferable operation.*—The operation which I prefer is, to open the urethra only, and not to puncture the bladder, which I hold, in the male, to be scarcely ever necessary.

*Case.*—One night, when giving the surgical lecture at St. Thomas's Hospital, a dresser of Mr. Chandler's, then surgeon to the Hospital, came into the Theatre to inform me that a patient was labouring under retention of urine from the use of a caustic bougie; that the man was in great pain, and that a catheter could not be made to pass the stricture. I said, "I will go with you into the ward after lecture, and do what is necessary." The pupils accompanied me. Upon examination of the man, I found that the stricture was seated in that portion of the urethra which was covered by the scrotum. I tried to pass different instruments, but could not succeed.

Reflecting upon the case, it appeared to me to be exposing the patient to unnecessary pain and danger if I punctured his distended bladder; as, when I directed him to make attempts to discharge his urine, the urethra swelled excessively behind the stricture, from the urine passing as far as its seat. I therefore determined to make an incision into the urethra only, which I immediately did, being directed to the place by the distention which an attempt to void the urine produced. The urethra was opened behind the scrotum, and the urine readily discharged. The patient rapidly recovered without any bad symptom.

I was also induced to act as I have described, by the following case. I was sent for early one morning to visit a patient with retention of urine, who had a cicatrix at the extremity of the urethra, from a chancre; for some time the urine had passed in a great degree by drops; and when in a stream, in one not larger than a hair. When I saw him, the urgency to make water was excessive, but not a drop would pass, yet I found that it distended the urethra as

far as opposite to the situation of the frænum. I therefore immediately passed a lancet through the cicatrix in the usual seat of the meatus, and so soon as I penetrated the glans the urine rushed by the sides of the lancet.

*Case.*—Mr. Robert Pugh, of Gracechurch Street, sent to me to visit a patient of his who had a retention of urine from stricture in the urethra, which no instrument would pass. Upon directing him to try to micturate, the urethra could be felt to swell behind the stricture, and I passed a lancet into it behind the obstruction. The urine directly flowed through the opening.

I now never open the bladder, but merely do as I have above described; and I am happy to say, that some of my surgical friends, at our Hospitals, have repeatedly adopted the same plan and successfully.

I sometimes introduce a female catheter into the urethra through the wound, to prevent extravasation and to permit the easy passage of the urine, but this is not absolutely necessary.

*Objections to the operation.*—This operation has been objected to, on the supposition that it requires great anatomical knowledge, and is very difficult to perform:—to the first objection I will say, that he who is adverse to an operation because it requires anatomical knowledge, should immediately give up his profession; for if surgery be not founded upon an accurate knowledge of anatomy, it will be better for mankind that there should be no surgery, as disease will proceed better with the natural means of relief, than with the aid of those surgeons who are not anatomists.

*Difficulty obviated.*—With respect to the difficulty of the operation, I would say to him who finds any, pass a catheter or staff to the stricture, and, directed by its point in making the incision, carry it an inch behind, and in a line with the point of such director, and the difficulty will vanish.

The state of the urethra in stricture is very different to that which exists with fistula in perineo: in the former case it is large behind the obstruction, in the latter it is contracted and very difficult to find.

*Little danger in this operation.*—By the mode I have advised, the danger of retention of urine is almost entirely dissipated, for opening of the urethra will be rarely followed by fatal effects.

#### OF RETENTION OF URINE IN THE FEMALE.

*Puncture rarely necessary.*—The puncture of the bladder is rarely required in the female; and when it becomes necessary the surgeon can hardly hesitate in his choice of the mode he shall adopt.

*Different modes.*—It might be performed through the vagina, or it might be executed by the side of the meatus between it and the branch of the pubes in some cases; but the former would probably cause a fistulous orifice, by which the urine would constantly irri-

tate the vagina, and the latter would for some causes of retention be impracticable.

*Above the pubes the best.*—The operation above the pubes appears to be, in all respects, preferable to any other; the steps of it are the same as those in the male, and therefore there is no necessity for my again describing it.

#### OF AMPUTATION OF THE PENIS.

*When necessary.*—This operation is occasionally required for a cancerous state of the part.

*Disease commences in the prepuce.*—The disease, which renders the operation necessary, commences sometimes upon the prepuce and sometimes upon the glans.

1. When seated upon the prepuce, it begins on a pimple, surrounded by a hard base; it ulcerates slowly and discharges a bloody serum, occasionally with a mixture of pus. At first, slight irritation only attends it; and, after a time, the patient experiences sharp darting pains. As the disease extends, a large portion of the prepuce participates in it; and if it be long suffered to proceed, a gland in one or both groins becomes affected. A phymosis is gradually produced, and a division of the skin must be made, to ascertain the exact nature and extent of the disease; and if the complaint be decidedly cancerous, it will be best to complete the operation at once, by cutting away the whole of the affected prepuce by a circular incision, and then securing the divided vessels. When the bleeding has ceased, a poultice should be applied, with which the wound heals better than by any other dressing.

*Commencing in the glans.*—2dly, When the disease begins upon the glans penis, it usually makes its appearance in the form of a wart, attended with considerable irritation, and a discharge of serous fluid. The wart ulcerates, and the surrounding parts acquire a great degree of hardness and swelling. Other warts, of a similar nature, are produced, so that the ulcers become numerous: they also extend deeply, and phymosis is occasioned by the surrounding tumefaction. Great impediment arises to the passage of the urine, but at length apertures form from the urethra through the skin of the penis: the patient suffers from irritation of the raw surfaces by the urine, and the disease is accompanied with those lancinating and shooting pains, which usually attend cancerous affections.

If the prepuce be slit up, the whole glans is found swollen, and excessively hard; and the penis, from the number of its warty excrescences, and from their eversion, has somewhat the resemblance in its appearance to the cauliflower.

*State of the corpus spongiosum.*—The corpus spongiosum and the urethra are diseased nearer to the pubis than the glans, and the surgeon must examine with care the extent of the complaint in that direction.



*Hæmorrhage.*—Free hæmorrhage from the ulcerated surfaces occasionally occurs, the glands in the groin become enlarged, and sometimes several in each groin; and when this happens all hope from surgery has vanished. The glands sometimes ulcerate and produce a very troublesome sore, with everted edges and irregular surface, a serous discharge, and sometimes free hæmorrhages.

*Destruction of the penis.*—The penis continues ulcerating until that part which is naturally pendulous becomes destroyed, occasioning retention of urine, and great difficulty in its discharge at other times. The urine passing in various directions excoriates the scrotum, and leads to a most painful but lingering termination of existence.

*Frequent cause.*—This disease is often the result of a natural phimosis, leading to a confined and irritating state of the secretions of the glandulæ odoriferæ; and, when the constitution becomes unhealthy, to the production of unnatural actions in the part.

*Medicine of no service.*—As to the treatment of this disease, nothing is to be done by medicine or applications, but to tranquilize the parts and to keep them clean.

*Irritating applications prejudicial.*—All irritating applications should be avoided. Poultices, ointments of bismuth, lead, chalk, opium, zinc, may be alternately employed, as that previously used loses its effect.

*Arsenic.*—Arsenic I have tried in these cases, but have never succeeded with it; on the contrary, it has greatly irritated and made the sore more extensive and the warts more numerous.

*Removal.*—The only means by which the effects of this dreadful malady can be averted, consist in the early removal of the diseased portions of the penis.

It is required, in doing this, that the surgeon proceed somewhat beyond the exact limits of the disease; more especially must he examine with care the urethra and corpus spongiosum, in which the complaint is usually most extensive.

The operation is dreadfully painful, but it lasts only for a moment.

*Operation.*—Its steps are as follow :

1st, Draw forward and elongate the penis as much as is possible.

2dly, Tie a piece of narrow tape tightly around the penis at the pubes.

3dly, Make a direct cut through the penis, behind the disease, without any attention to preserving the integuments to cover the corpora cavernosa and corpus spongiosum; for to do so is a great evil, by preventing a free escape of the urine.

*After-treatment.*—4thly, Tie a tape tightly around the remaining part of the penis, and make pressure upon it, and there is no necessity for securing any blood vessel.

When the bleeding has stopped, remove the tape and apply lint upon the wound.

In a few hours, the necessity of micturating will remove the dressings; and when the danger of bleeding has ceased, a poultice should be applied as the best means of exciting granulation and of healing the sore.

*Introduction of bougie.*—When the surface begins to granulate, a piece of bougie, two inches long, is to be worn constantly in the urethra, to prevent its contraction, otherwise it gradually closes as the wound heals, and produces retention of urine.

## LECTURE XXVI.

### OF FISTULA IN ANO.

*Definition.*—This is an abscess of the cellular membrane, near to the rectum, which produces an aperture into the rectum, or by the side of the anus.

*Difficult to heal.*—If it be asked why this abscess is so much more difficult to heal than others, and why it frequently requires an operation; the answer is, that from its vicinity to the rectum, it is influenced by the action of the sphincter and levator ani; and that these muscles have a constant tendency to prevent the union of the granulations and coalescence of the sinus. It therefore rarely happens, but that the surgeon is required to assist nature in the restoration of the parts to a healthy state, by dividing the sphincter, and thus destroying its influence upon the sinus.

*Symptoms.*—The symptoms of this disease are, pain near the anus, with considerable hardness, bearing down, and tenesmus upon going to stool, and difficulty in the evacuation; throbbing and darting pain in the rectum, and on the diseased side of the nates. A fluctuation is perceived; and if the case be left to nature, the abscess breaks either into the rectum, and the matter and blood are discharged with the fæces, or it breaks externally near the anus, but sometimes at a distance from it, either in the perineum or in the nates. The matter which issues from the abscess is sometimes excessively putrid, extricating a considerable quantity of air, and is highly offensive.

*Discharge of the matter.*—The fistulous orifice, when it is formed into the rectum only, is the most difficult of management, because the orifice is with difficulty discerned. When the abscess breaks both externally and into the rectum, it is most easy of treatment; but it generally discharges itself only externally; and a probe, when introduced, passes to the side of the rectum, sometimes to the external surface of the intestine, at others from half an inch to an inch from it, so that the original seat of the matter is in the cellular tissue surrounding the rectum.

*Extensive sinus.*—I have several times known a sinus form on each side of the anus, and communicate around the rectum, of which we have a preparation in the collection of St. Thomas's Hospital, so that the rectum has been considerably separated from the surrounding parts. I examined a man who died of a discharge from a sinus in the groin, and who had a fistula in ano; and upon tracing the sinus in the groin, it passed under Poupart's ligament and took the course of the vas deferens, and descended into the fistula in ano.

*Small sinus.*—Sometimes the sinus only just reaches the sphincter, and is extremely small, at first appearing only as a suppuration of one of the follicles of the anus. Sometimes the matter burrows four inches by the side of the rectum.

*Caused by a pile.*—The abscess has, in some instances, its origin in a suppurating pile.

*Origin sometimes local.*—Fistula in ano is, in a few instances, a local disease, depending upon a change in the part itself; but is much more frequently the result of distant visceral complaints, and of a broken state of the constitution.

*How produced.*—When confined to the part, it arises from obstinate costiveness and the efforts to discharge the fæces; and the passage of an indurated stool produces inflammation of the muscles and cellular tissue of the rectum. But the opposite state to the above I have several times known produce it; thus, in a severe diarrhœa, which determining large quantities of blood to the rectum, and being accompanied with tenesmus, is followed by inflammation and suppuration at the extremity of the rectum.

But the more common cause is disease of the liver, which, preventing the free return of blood from the intestines, leads to inflammation at the anus, and by influencing the secretions for the intestines, occasions a similar effect.

Diseased states of the lungs are also frequently giving rise to it, from the impediments they produce to the free return of blood, local venous congestion is produced: piles are a common effect, and abscesses at the anus frequently follow.

*Connected with phthisis.*—Often, therefore, before a person perishes from phthisis, he has a fistula in ano; and this is the reason fistula is considered as a dangerous disease; although in reality it is not so, but it is the consequence of more important diseases, which destroy life.

The surgeon often brings discredit upon himself by operating in these cases in the last stage of phthisis, when no operation ought to be performed, and when it is impossible the disease can be cured; therefore that death, which is the result of pulmonary disease, is falsely attributed to the fistula in ano.

*Treatment Medical.*—The medical treatment of this disease consists in restoring the secretions of the liver and intestinal tube, by submuriæ hydrargyri, or pil: hyd: at night, and infus: gentianæ compositum, with soda and rhubarb, twice in the day; and if there



be any pulmonary or pectoral disease, its treatment must precede, and its cure be performed, before any active local means of treatment be had recourse to. The strength of the patient must also be restored before any operation be performed, or the wound will not heal favourably.

*Local.*—If a patient applies with a tumour near the anus, threatening the production of an abscess, and the general health be tolerably good, its treatment is to be as follows:—apply leeches to the part, and let a lotion of the acetate of lead be constantly kept upon the surface. Give to the patient the confectio sennæ with sulphur, as the most gentle aperient; all drastic medicines exert too much action of the muscles of the rectum, and determine blood to the anus, so as to add to the irritation and increase the disposition to suppuration.

*To be opened early.*—If the swelling increase and become more painful, apply fomentation and poultice to the part. When a fluctuation can be perceived, put a lancet into the swelling, as an early opening prevents a large collection of matter, and I have known the wound immediately close and no fresh accumulation follow.

If it break by natural efforts, it is best to suffer it to discharge and to fill by granulating, to make the sinus as small as possible before any operation be performed.

The sinus very rarely heals entirely by natural processes, because, so soon as its sides adhere, they are pulled asunder by the action of the sphincter ani, and union is thus constantly prevented.

*Four states of fistula.*—There are four variations of the fistula, as regards the operation.

*Operation for the first.*—The first is that in which the abscess breaks into the rectum and near to the anus; and the operation consists in the following steps: introduce a probe into the sinus, by the side of the anus, and carry it into the rectum, so as clearly to ascertain the course of the sinus, and to learn if any part of it extends above the opening into the rectum. Then introduce the director, and pass the probe-pointed bistory of Mr. Pott through the sinus into the rectum. The finger covered with oil is next to be introduced into the intestine, and is to be placed upon the extremity of the probe-pointed bistory; then, if the sinus be of considerable length, the finger and knife are brought out together, so that the knife cuts the intestine and sphincter as it is withdrawn. If any portion of the sinus remain above the opening into the rectum, it should be divided with the probe-pointed scissors; one blade of which is passed into the extremity of the sinus, and the other into the rectum, and then, by shutting them, the sinus is divided. If the opening into the intestine be situated only a short distance from the anus, the end of the bistory, may be first brought out at the anus and the operation completed by pushing the knife forwards.

*Second state.*—The second state of the sinus is that in which the opening is only at the anus; and when the probe is passed into it,

it is felt at the extremity of the sinus, at some distance from the rectum.

*Operation.*—In this case, what I do is this; I pass the probe-pointed bistory to the extremity of the sinus and my finger into the rectum. I then, with the extremity of the finger and the finger-nail, move the rectum upon the blade of the knife near its probed extremity, and sometimes move the knife a little at the same time. Thus I easily make the knife divide the intermediate parts, and then bring its probed point into the rectum, when the operation is concluded as in the first case. I have known, in this instance, the division made by the sharp-pointed curved bistory; but the objection to it is, that its point rarely takes the course of the sinus: then a portion is left undivided.

Savigny, an ingenious instrument-maker, made a double bistory, with a pointed and a probed knife; the one sliding by the side of the other. When it was introduced the sharp-pointed bistory was thrust forward, and then retracted, and the probed bistory succeeded it; but the objection to this instrument was, that it was too large for its easy introduction into the sinus, and it is really quite unnecessary.

*Third state.*—The third state is, that where the sinus enters the rectum, and has no external opening. It is required, if the orifice cannot be felt by introducing the finger into the rectum, to wait until an accidental inflammation leads to the capacity of feeling a swelling externally, when a lancet should be put into it from the side of the anus. A probe being introduced, it passes into the suppurating cavity communicating with the rectum.

*Operation.*—In this case it will be proper to perform the operation which has been described for the first state of fistula when there is an opening externally, and within the rectum.

*Fourth state.*—The fourth and last state is, that in which the sinus or sinuses extend from the anus into the nates.

*Operation.*—The practice I pursue is, then to divide the opening in the nates through the external skin, but leave that near the anus at first undivided, and when I have healed this part, then operate upon the other in the same manner as in the second kind of fistula.

#### OF TREATMENT AFTER THE OPERATION.

*Local.*—When the fistula has been divided, put dry lint into the wound, and compress the part until all bleeding has stopped. On the following morning apply a poultice, and in two or three days the lint will separate. Then pass a probe into the wound often, to prevent the union of the sides of the sinus for five or six days from the operation, and continue to poultice; but after this time, when granulations arise, it is right to introduce lint into the wound, and prevent their inosculation, until the wound, gradually granulating every where, the cavity becomes filled. If lint be introduced into the wound on the second, or third, or following days from the ope-

ration, great pain is given, and much inflammation is excited, so that there is danger of fresh suppuration: wait, therefore, until the inflammation has ceased, and then introduce but a small quantity of lint, and with great gentleness.

*Constitutional.*—If the sore be very indolent, occasionally purge the patient, and give him the *confectio piperis*, which produces very healthy granulations, and apply to the wound lint dipped in a solution of the sulphate of copper or spread with the *unguentum hydrargyri nitrico oxydi*.

#### OF INJECTIONS FOR FISTULA.

*Of the cure by injection.*—Although, as it will be readily believed, I have seen a multitude of cases of *fistulæ*, I have only known two cured by injection, which were as follow:

I was attending with Mr. Pugh, surgeon, of Gracechurch Street, a lady, in Fenchurch Street, who had a fistula on each side of the anus. I opened one fistula, and cured it; but the patient would not submit to the operation upon the other. Mr. Pugh and I therefore agreed that we would try other means, and we injected into the sinus with *oxymurias hydrargyri*, the *liquor calcis gr. 1. ad ʒj.* and the sinus healed.

*Case.*—The second case was a gentleman from the North, a friend of Lord Harewood, who had been under the care of Mr. Hey, of Leeds, for a fistula on the right side of the anus, and who came to me for advice. The fistula was of great depth and distance from the rectum upon the opposite side. I feared opening it, both from the delicate health of the patient, and the danger of hæmorrhage; and therefore threw into the sinus equal parts of port wine and water. My nephew, Mr. Bransby Cooper, finding it did not bring on sufficient inflammation, injected port wine, undiluted, and thereupon inflammation followed; adhesion was produced, and the case terminated without further alteration.

#### OF SETON FOR FISTULA.

*Of the cure by seton.*—Timid persons prefer this mode of treatment to the knife, although in the one case the irritation is long continued, and in the other the pain is only of a few minutes continuance.

That it succeeds, in some instances, I have known; for some of my patients, having submitted to this remedy, returned to me well.

My objection to it is, that the irritation it produces is liable to occasion other abscesses, whilst healing that for which it is employed.



## OF PILES OR HÆMORRHOIDS.

*Two states.*—These are found in two states, viz. a varicose enlargement of a vein; or an excrescence arising from its adhesion and organization.

The first is external or internal.

*Of the external*—The symptoms of the first are, an external swelling, which feels round and hard, which is painful at the passage of the stools: is hot and itches at other times. It sometimes bursts, and discharges blood with the stools. In a few days it declines and disappears. Sometimes it becomes inflamed, and very acutely painful; and it now and then suppurates, and lays the foundation of fistula. If cut into before suppuration, a large and very solid clot of blood passes from it.

Repeated returns of this complaint engender an excrescence, which arises from the swelling having undergone adhesion, and becoming organized, forming a cutaneous tumour which is very vascular. The skin over it is thin,—the substance very irritable, and pains shoot from it into the rectum to a considerable height from the anus. I have known a person confined to her bed from the excoriation and suffering produced by such excrescences originating in external piles.

*Internal.*—The internal piles are originally enlarged veins: they produce pain about the sacrum, bleed frequently, and render the passage of the motions difficult; and the stools are often mixed with blood.

At length many of these become obliterated by adhesion, and form very vascular pendulous tumours in the entrance of the rectum.

*Occasion prolapsus ani.*—They often occasion prolapsus ani; the patient feels as if there was more motion to discharge, and he forces the rectum until a part of it becomes everted, and the internal piles appear externally, thus producing prolapsus ani. The patient, after each evacuation, is obliged to return these with the finger; the evacuation is in consequence highly painful, tedious, and very often the return of the part is exceedingly difficult.

*Profuse hæmorrhage.*—The bleeding from the piles thus everted is often so profuse, that the weight of the blood exceeds that of the fæces. They sometimes vent a considerable serous discharge. When the number and size of the piles, and the degree of prolapsus becomes great, and there is much difficulty in their return, inflammation sometimes arises in them, and their return is rendered impracticable, without giving an unjustifiable degree of pain. When in this state, in addition to other sufferings, the urine is retained, the fæces pass with extreme difficulty, and there is a free sanious discharge from the part. When thus inflammation is the result of a strangulation of the piles from the pressure of the anus, it is immediately relieved by the return of the parts; but often the

inflammation precedes the descent, and then the parts are too tender to be returned. It now and then happens that by this process nature effects a spontaneous cure of the disease; the parts proceed to gangrene, and a slough of the piles is produced, the rectum ceases to prolapse, and at least for a great length of time the patient is rid of his complaint.

*Causes, sedentary habits.*—The usual cause of piles is a sedentary habit, which leads to congestion of blood in the vessels of the rectum.

*Diseased liver.*—A diseased state of the liver is also a cause, by preventing a free return of blood.

*Obesity.*—Obesity occasions them, by the pressure of the omentum and mesentery upon the mesenteric veins.

*Pectoral disease.*—They, like fistula in ano, frequently arise from pectoral complaints, which affect respiration and the freedom of circulation.

#### OF THE TREATMENT OF PILES OR HÆMORRHOIDS.

*Of the external.*—If a patient applies with an external pile, open his bowels freely with *confectio sennæ* and sulphur. Apply leeches to the parts, and a lotion of acetate of lead. If, when the inflammation be subdued, the vein remains enlarged and hardened, puncture it with a lancet, and discharge a large and very firm clot of blood which it contains.

If it suppurate, fomentation and poultice will be the best applications: and when it bursts, if it shows no tendency to heal, it must be opened into the rectum.

*Removing excrescences.*—The excrescences left by external piles are growths only of the skin, and they may be freely removed when they become troublesome. Subdue the inflammation first, with evaporating lotions, and then remove them by scissors, or by the knife. The former is by far the most painful mode to the patient, but most easily performed by the surgeon.

*Do not bleed.*—These excrescences furnish no bleeding of any consequence.

*Mode of removal.*—I generally pass a tenaculum through them, draw them towards me, and cut them off with a lancet.

*Treatment of internal piles.*—The treatment of internal piles is more difficult, and requires attention to a number of circumstances.

*Medical.*—First, The medical treatment demands the exhibition of *confectio sennæ cum sulphure*; the bals: *copaibæ* is also a good medicine. If there be hepatic congestion, gentle doses of blue pill should be given, to restore the biliary secretions; in general, however, mercury disagrees in piles: Ward's paste, or *confectio piperis* of the London Pharmacopœia, is an admirable remedy, opening the bowels gently and contracting the dilated vessels; soda

and rhubarb I have known useful. If piles arise, as they sometimes do, from diarrhœa, the confectio opiata is the best medicine.

*Local.*—The local treatment, to prevent their increase, is to inject cold water into the rectum twice per diem; a dilute aluminous injection is also useful combined with decoction of oak bark.

*Diet.*—The diet must be attended to; animal food is better than vegetable, as occupying less bulk to afford the same degree of sustenance, and consequently presses less upon the returning blood vessels. Mutton is the best butcher's meat. White fish is easy of digestion. All flatulent food should be avoided. A good deal of exercise should be taken; and I have seen, in the incipient state of this disease, horse exercise of great benefit.

*Hæmorrhage.*—When the piles bleed, the medicine should be infusum rosæ cum magnesiæ sulphate; cold water should be still injected.

*Prolapsus.*—If prolapsus be produced, it should be washed with a solution of alum and oak bark, and it should be returned by a piece of linen dipped in oil, or covered by ceratum cetacei.

*Inflammation.*—When the piles are inflamed and a prolapsus is produced, purge the patient once freely; apply leeches; foment and poultice the part, and give opium as soon as the purgative medicine has operated. For two or three days let the bowels be quiet: the leeches, fomentations, and poultices being continued, then purge again; for daily purging adds to the inflammation and irritation.

I have known the application of cold water to the prolapsus useful, also the acetate of lead lotion, and the lotion mixed in a poultice, agrees best upon the whole; although the warmer applications are the most congenial to the patient's feelings.

*Puncture.*—Spontaneous bleedings from the piles greatly relieve them; and I have therefore sometimes punctured them with a lancet, with a view to the relief of the congestion of the vessels.

However, all the means which can be employed will not always prevent their increase; nor when they are once suffered to acquire considerable magnitude, and to produce prolapsus ani, can they be subdued by any medical or local treatment short of operation.

*Mode of examination.*—To examine a patient properly under these circumstances, and to enable you to form a correct judgment of the necessity for, and the mode of, operating, it is necessary that the patient should have an evacuation; and that, before the return of the prolapsus, the surgeon should examine the part.

He will then observe a portion of the rectum, forming the outer circle, and a number of round and dark-coloured projections, occupying the more central parts of the protruded mass. The operation is then ascertained to be necessary or not, according to the degree of prolapsus and the number and size of the piles.

Having determined that an operation is required, it is next to be considered in what manner it is to be performed.



*Two modes of operation.*—It may be done by excision, or by ligature, or it may be effected by a combination of the two.

*Excision.*—For excision, in the early part of my surgical career, I was a strong advocate; for I found it a less painful operation than ligature, and it appeared to me not dangerous; but as my experience increased, I was induced to change my opinion, and to consider excision as not divested of danger.

The three following cases are proofs of this: the first, dying of inflammation; and the second and third from hæmorrhage. I have also seen, in a fourth case, extensive suppuration produced by excision.

*Case.*—Mrs. O——, the wife of a respectable medical man, came to London to have some hæmorrhoids removed; and I advised their excision, observing, that her constitution was of a feeble and irritable kind. I removed only one of three which appeared. In three days after the excision by scissors, I found her complaining of great pain in her abdomen, from intestinal and peritoneal inflammation: she frequently vomited, and her abdomen became tense. The symptoms were not relieved, although motions were procured, and she died in a week from the operation. The internal surface of the intestine, and the peritoneum, were inflamed extensively.

*Case.*—Mr. Esdaile came to London from Guernsey or Jersey, in order to have a hæmorrhoid removed. Mr. Leman and I attended him, and I removed a single pile by scissors. On the following day he was exceedingly low, his pulse small, so as to be scarcely perceptible. On the next he voided a great quantity of blood from his intestines; and on the day after he died, falling a victim to internal bleeding, from the return of the divided vessel with the prolapsed intestine.

*Case.*—The Earl of S—— applied to me for piles with prolapsus ani, and I removed some of the largest with scissors; the prolapsus was greatly relieved; and for more than twelve months after he was little troubled, either with hæmorrhoids or prolapsus. About two years afterwards he again applied to me, for a return of his complaint; and seeing his age, and having examined the piles, I thought before I operated, I would have a consultation, when the operation of excision was again recommended. I removed with the scissors one of the largest, and desired his lordship to keep the recumbent posture. He laid down upon the bed immediately after the pile was removed. In about ten minutes he said “I must relieve my bowels,” and he rose from his bed and discharged into the close stool what he thought to be fæces, but which proved to be blood. In twenty minutes he had the same sensation, and evacuated more blood than before, in about the same lapse of time: he again rose, and soon became very faint from the free hæmorrhage. I, therefore, opened the rectum with a speculum, and saw an artery throwing out its blood with freedom, I therefore requested him to force down the intestine as much as he could, and raising the orifice of the bleeding vessel with a tenaculum, secured it in a

ligature, and also compressed the artery with a piece of sponge. His lordship bled no more. On the following day he was low, his pulse very quick, and he had a shivering: on the next he complained of pain in his abdomen; he had sickness, and tenderness upon pressure, and in four days he died. In the presence of Mr. Wardrop I opened his body, and found inflammation of the rectum, and disease of the glandulæ solitariæ of the intestine, they being enlarged and hardened, so that the intestine internally had a curious spotted appearance. He was not, therefore, a healthy or sound man in other respects; and it is in such cases that unexpected symptoms arise after operation.

*Ligature.*—As a ligature prevents the danger of bleeding, it is best to use it, although the process is more tedious and painful. The pain which it produces may be mitigated by not drawing the ligature too tight. Draw down the pile with forceps, or a tenaculum, and tie a piece of waxed silk around it, draw the knot until the patient complains severely, then tie a second, cut off the ligature a little way from the knot, and return the intestine and pile.

*Double ligature.*—But in cases in which the pile is very large, a safer and less painful plan may be adopted; namely, to pass a needle and ligature through them, and to cut them off beyond it.

*Operation.*—The mode of operating for these large hæmorrhoids is as follows: Draw down the pile, pass a needle, with a double ligature, through its juncture with the intestine. Cut off the needle, and the two ligatures will remain on the pile; then tie one above, and the other below, and thus the whole pile is included; then cut off the pile with a lancet or scissors beyond the ligature, and in the evening or on the following day, the threads may be removed, as all danger of bleeding has ceased.

By this operation hæmorrhage is prevented, and the pain is exceedingly diminished, as the ligature does not require to be made very tight.

The prolapsus ani generally soon ceases after the complete removal of the piles; but if it does not, cold and astringent injections should be employed, and the confectio piperis be given.

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## LECTURE XXVII.

### OF POLYPUS OF THE NOSE.

*Four kinds.*—POLYPI of the nose are of four kinds: 1st, The common pendulous polypus; 2d, The hydatid polypus; 3d, The cancerous; 4th, The fungoid.

## OF THE COMMON PENDULOUS POLYPUS.

*Symptoms.*—This disease is marked in its commencement by an occasional obstruction in the nose, as if from catarrh; the obstruction being increased in foggy and damp weather, and being greater early in the morning and late in the evening than in the middle of the day.

*Age.*—Persons of all ages are subject to the formation of these polypi: but it is of more common occurrence between the ages of forty and fifty than at any other period.

*Appearance.*—On looking into the nose, a jelly-like appearance is seen, which, upon directing the patient to inhale through the nostrils, recedes, and upon his exhaling advances and re-appears; the degree of motion, however, necessarily depends on the magnitude of the polypus compared with that of the nostril. The voice has a nasal sound, and there is generally some uneasiness felt between the eye-brows, in the situation of the frontal sinuses.

*Seat.*—The polypus grows from that portion of the schneiderian membrane which is situated upon the same side with the turbinated bones. I have never yet seen a polypus growing from that covering, the septum narium. The body of the polypus is generally yellow, and is streaked with few vessels. Its neck diminishes often to a very small stalk. Now and then two or three polypi grow from a single stalk. When a polypus becomes very large, instead of advancing to the nostril it recedes into the throat, appearing behind the velum palati; and sometimes when it grows from the back of the nares, it makes its first appearance in the throat. It here becomes of very considerable size, and at length would readily allow a ligature to be passed around it; but this, as I shall presently describe, is not the best mode of its removal. When it appears in the throat, I have seen its body divided into a number of different portions.

In the collection at St. Thomas's Hospital, their great size and broken surfaces are well seen in many preparations, as well as their origin from the pituitary membrane.

## OF THEIR REMOVAL.

*An operation necessary.*—No other mode than an operation will succeed in removing these excrescences. I have repeatedly tried the application of caustic; but it only acts upon the surface, and the root grows faster than that surface can be destroyed. Aluminous and other astringent applications render the breathing a little more free at the moment, but produce no permanent relief.

*Three modes.*—Three modes have been proposed for their removal: 1st, by laceration; 2d, by excision; 3d, by ligature.

1st. *By laceration.*—1st, Laceration is the usual mode. For this purpose, a surgeon should be provided with two pairs of forceps;



one pair slightly curved, terminating in a point hollowed at the end and that hollow containing pointed teeth, having an aperture in each blade. A second pair, formed like common dressing forceps, only the blades longer and more slender, having serrated teeth, received between each other like a serrated suture of the skull. These can be received into the smallest nostril, and readily made to act in any part of it.

*Operation.*—The operation is performed as follows: the patient sits upon a chair opposite a strong light, a probe is then introduced into the nostril, and the surgeon feels with it the exact situation of the stalk of the polypus; then withdrawing the probe, he passes the forceps to the stalk, and, enclosing it between the blades, with very gentle jerks, he either tears through the stalk, or draws away the portion of membrane from whence it grows: instead of removing it by jerks, the surgeon may turn the instrument upon its axis, and thus lacerate the stalk of the polypus. Now and then a thin film of bone separates with the pituitary membrane, which only more effectually secures the patient from a return of the disease.

If more than one polypus exist in the nostril, a separate operation is required for each; and if they exist upon each side, the operation may be performed on the same day in each nostril, for there is no danger in this operation. I never knew but one person die in consequence of it; he had previously had some disease in the brain, a piece of lint was placed in the nostril, after the operation, and this gentleman died a few days after of inflammation of the brain. It is better not to introduce lint, or any extraneous substance likely to produce irritation, immediately after the operation.

*No serious hæmorrhage.*—The hæmorrhage which results from this operation never amounts to any serious quantity.

As the disease is liable to return, when the inflammation succeeding the operation has subsided, aluminous injections may be used, or the liquor calcis with oxym: hydrarg: to lessen the disposition to the return of the complaint.

To remove them from the posterior nares, I have used curved forceps, introduced behind the velum; but they do not answer so well as the mode I have next to describe.

#### OF THEIR REMOVAL BY EXCISION.

2d. *By excision.*—This operation requires a pair of scissors with probed extremities, made straight, with long and slender blades.

*Operation.*—The patient being placed as in the former operation, the scissors are at first introduced shut, in order to ascertain the attachment of the polypus; and being then opened, the stalk of the polypus is cut through; then the surgeon, closing the other nostril, directs the patient to blow forcibly through that in which the operation has been performed, when the polypus is immediately ejected; but if the polypus appear in the pharynx, the surgeon divides the stalk in the same manner as before, and then putting his finger

behind the *velum palati*, he with it draws the polypus away through the fauces. In that way the largest polypi are to be removed; and I have never seen either danger or difficulty arise from its performance; but, on the contrary, have several times succeeded when the forceps by the nostrils had been employed in vain.

*Objection to this mode.*—It has been objected to this mode of operating, that very considerable hæmorrhage is produced by it; but this can only arise from a very indiscreet manner of performing it, by repeatedly cutting the pituitary membrane, which could hardly happen with probed scissors.

*3d. By ligature.*—The third operation, namely, that by ligature, is now very generally abandoned by surgeons, on account of the difficulty of its application, and the necessarily imperfect removal of the disease.

*Disease resembling polypus.*—There is a disease in children very frequently mistaken for polypus, by men who have not had much experience in surgery. It is an elongation of the pituitary membrane of the nose, from relaxed constitution, and from effusion of serum into the cellular tissue of the part; it is red and very vascular. It appears more upon the extremity of the superior turbinated bone than upon the inferior; but I have seen it upon both. It sometimes becomes chronic. It requires alterative medicine, and the application of a solution of alum, or of sulphate of copper, or nitrate of silver. I have more than once known this disease removed by forceps cruelly and unnecessarily.

#### OF HYDATID POLYPUS.

*Occurring in young persons.*—The nostrils of young persons sometimes become filled with growths which appear of the hydatid or encysted kind. They resemble wetted bladders hanging within the nose, are unattended with pain, but produce the inconvenience of occasional obstruction. When pressed with forceps they burst, and discharge a mucus, somewhat resembling that secreted by the schneiderian membrane: the cyst only is removed by the forceps. The nose may be repeatedly cleared of them by instruments, but they are always regenerated. By continued growth they enlarge the nostrils, and deform the face.

*Two modes of removal. By alum.*—I have seen them removed in two modes: 1st, By the use of a strong solution of alum introduced on lint, and constantly worn; 2dly, By the daily application of the muriate of antimony used by a dossil of lint through the medium of a canula. The first is the preferable mode; but I cannot decidedly speak as to its preventing the return of the disease: they are destroyed more quickly by the muriate of antimony, but with much more suffering.

## OF THE CANCEROUS POLYPUS.

*Occurs in elderly persons.*—This is a disease of age.

*Symptoms.*—It commences with obstruction in breathing, but is, at first, unattended with pain; as the disease increases, the sufferings are very acute, and not confined to the diseased part, but extend to the different branches of the fifth pair of nerves, striking sometimes into the brain itself.

*Slow growth.*—Its growth is slow, and it is some time before it produces any discharge; but at length it ulcerates, and discharges a bloody serum.

*Colour.*—Its colour is purple; its feel is firm. It sometimes bleeds with great freedom. It sloughs, and in its progress it produces great alteration in the form of the face, which it disfigures horribly. It extends into the sinuses, and frequently affects the lachrymal sac.

It often alters the roof of the mouth, producing absorption of portions of the superior maxillary and palate bones.

*Destroys life gradually.*—It is a long time in destroying life; the latter days of the patient cannot but excite pity in the most unfeeling bosom. Medicine and surgery do nothing for this disease; excepting opium, belladonna, hemlock, and hyoscyamus are administered locally and constitutionally to mitigate, in some degree, the patient's tortures; and the dose of the former is at last increased to keep the patient in a constant state of torpor.

## OF THE FUNGOID POLYPUS.

*Occurs at all ages.*—The fungoid polypus occurs at all periods of life; but the best case which I can give of this disease is the following.

*Case.*—A young gentleman came to my house with a large purple excrescence projecting from the nostril, which completely obstructed the passage on that side. I made a cast of this disease, which is now in the collection at St. Thomas's Hospital. There was a copious discharge of sanious fluid from it; but the disease was little painful, and the general health was, at first, but little affected. I passed a ligature around the root of the polypus as high as I could reach, and it sloughed away without hæmorrhage. I was gratified with the result of this operation, as the patient appeared to be greatly relieved; but some time afterwards I heard that the disease had returned, and that it had been again removed. It again grew, and ultimately destroyed life. The head was examined, and the disease was found to have grown from a very small surface of the pituitary membrane.

*Extends.*—In general the disease enters the different sinuses, affects the lachrymal sac, and ductus ad nasam; bleeds copiously, but has not the pain accompanying cancerous disease. The patient



dies from copious discharge, the frequent hæmorrhages, and at last from nervous irritation.

#### OF POLYPUS EXCRESCENCES IN THE PHARYNX.

I have seen two cases of this disease.

*Case.*—One in a Spanish gentleman, who came through Paris, where he consulted various surgeons: and on his arrival in London, asked my advice for a polypus excrescence in his pharynx, of the colour of the mucous membrane of this portion of the alimentary tube, beginning from the fold over the palato-pharyngeus, and hanging down like a sausage into the pharynx. By great efforts he could regurgitate it into his mouth. I requested him to permit me to pass a ligature around its root, which I succeeded in doing, without much difficulty, and it separated in eight days.

*Case.*—I lately saw a second case, with my nephew, Mr. B. Cooper: it was similar to the former in appearance, but not quite so large, and grew more from the root of the tongue. I removed it also by ligature, and both these cases completely succeeded.

#### POLYPUS OF THE RECTUM.

I have several times seen the following disease.

*Case.*—A lady sent for me to see her infant, who, she observed, after a motion, had a substance like an earth-worm appear at the anus, of considerable length, and of a red colour. Upon examination, after an evacuation, I saw at the anus a red projection, and upon pulling it down, found it to be of considerable length, growing about an inch to an inch and a half from the anus, attached to the interior of the rectum. I drew it down, put a thread around it, and cut it off as near to its origin from the rectum as I could, and it never returned.

*Case.*—Sometime after, a child was brought to me from Surrey, with the same disease; the substance looked like a leech, and I cut it off without putting a thread around it. Whilst at Lecture I was sent for to attend the child on account of hæmorrhage and I begged Mr. H. Cline to visit the patient for me; but he soon returned and informed me, that the bleeding had been of little consequence, and had stopped spontaneously. The child recovered.

*Case.*—In a stone patient of Mr. Gaitskell's, upon whom I was operating, the child having prolapsus ani, I saw a small excrescence, red and pendulous, growing upon the mucous membrane of the intestine, which I thought was the commencement of one of these diseases.

*Case.*—I have only twice seen this disease in the adult; once at the age of twenty-three years: I put a ligature upon its root, and removed a portion beyond the ligature, having the external appearance of a common earth-worm.

*Case.*—An apothecary of Bristol, a friend of Mr. Brickenden,

surgeon, in the Borough, came to me some years ago with a polypus growing in his rectum, about two inches from the anus, which I removed: he had previously been subject to dyspeptic symptoms, with great irritability of the rectum, which subsided after this operation, and the use of alterative medicines which were given him.

#### OF FUNGOID POLYPUS OF THE RECTUM.

*Case.*—A gentleman was brought to me by Dr. Hopkins, of Peterborough, who laboured under this disease, the symptoms of which were a copious and sanious discharge from the rectum: very little pain; but upon his going to stool, or even by efforts in which the fæces were not discharged, a polypus was protruded, having a broken surface like a cauliflower, large as an egg, and of a dirty brown colour, breaking readily, and bleeding where it broke. The general health had not materially suffered. I put a ligature upon the neck of this polypus near to the mucous membrane of the intestine; it sloughed away in a few days, and for some time the gentleman appeared to be well; but having occasion many months afterwards to go through Peterborough, I was requested to see this gentleman; when I found the disease had returned, that the rectum had ulcerated, and that his health was broken: soon after he fell a victim to the disease.

In the present state of medical and surgical knowledge, this disease, like the scirrhus-stricture of the rectum, will prove destructive.

#### OF ENLARGED TONSILS.

*Of frequent occurrence.*—Enlargement of this part from common angina is a frequent occurrence; and it is best relieved by purging, by leeches applied to the throat, or by a blister placed beneath the angle of the lower jaw.

*Sometimes suppurate.*—If the gland suppurate, the pain is exceedingly severe; the attempts to swallow are agonizing, and the painful sensations extend along the Eustachian tube to the ear. When matter has formed in the tonsil, it may be detected by applying the finger to the surface of the gland in the fauces.

*Treatment.*—Fomentations and poultices assist its progress most effectually; and I think, upon the whole, that they do best when left to break spontaneously. But when great difficulty of breathing attends the presence of matter, it should be discharged by puncture with a small lancet, or with the knife used to divide the cornea. Some danger attends the operation of opening such abscesses, and circumspection is required to prevent a wound of the internal carotid artery.

After the matter is discharged, the case speedily does well.

*Chronic enlargement.*—Sometimes a chronic enlargement of the tonsils occurs, and injures the health by the difficulty of breathing it produces, the person is obliged to sleep with the mouth widely

opened, yet still there is much impediment to the passage of the air, and consequently much stertorous noise.

*Symptoms.*—Children labouring under this disease are often found during sleep in profuse perspiration, especially about the head, arising from this excessive dyspnœa.

*Treatment.*—The treatment of this state consists in applying powdered alum to the surface of the tonsil; in using the sulphate of copper, in substance, so as to whiten the surface; or the nitrate of silver, which produces the same effect, and from the employment of which I have known great advantage derived; scarification I have also seen of service.

*Removal sometimes required.*—If the disease resists these modes of treatment, it will be right to remove the enlarged portion of the gland, either by ligature or by excision.

*By ligatures.*—A ligature is employed in those cases in which the tonsil is pendulous, and in which the enlarged part is connected to the throat by a narrow neck.

To apply a ligature, an iron is required, with a small fixed ring at its end, and a waxed portion of silk.

*Operation.*—The patient sitting before the surgeon, and the thread being passed through the ring of the tonsil iron, an assistant holds one end of the ligature against the cheek, and the surgeon retains the other in his hand. The iron is then carried above, behind, and then below the tonsil, and is, with the end of the ligature, brought out of the mouth; after thus nearly surrounding the gland, a single knot is made, and one end of the thread being again passed through the ring of the tonsil iron, the knot is by means of it made fast, and a second knot is then made, in the same manner. The silk is left upon the tonsil until it ulcerates through the gland, which it does in about a week.

*Another mode.*—When the basis of the swelling is large, a needle has been advised, armed with a double ligature, which is to be passed through the base of the gland: then each ligature is to be tied separately, one before and the other behind the tonsil, and by this mode the ligatures are prevented from slipping; but their application is very difficult, and, as far as I have seen very imperfect. Rather than adopt it, I advise the removal of a portion of the gland by excision.

*By excision.*—This is to be done by a pair of curved scissors with probed extremities, with which there is less risk of wounding any important part. It is best, however, to remove small portions, and to proceed gradually, by repeating the operation as occasion requires; and to touch the surface with nitrate of silver or sulphate of copper.

In these cases there is usually much general debility, and it is right to give soda, steel, and rhubarb, and advise country or sea air with bathing, and a generous diet.



## OF ELONGATION OF THE UVULA.

*Sometimes of great length.*—I have seen this part grow to a considerable length. There is one in the collection at St. Thomas's Hospital, which the boy could throw forward between his incisores teeth.

*Symptoms.*—By hanging upon the epiglottis, it produces coughing, or by irritating the pharynx it occasions sickness; and by creating irritation of the glottis it produces an alteration in the voice.

*Cause.*—It arises from relaxation and over exertion of the voice in speaking.

*Treatment local.*—Stimulating gargles, sulphate of copper in solution, or directly applied in substance, and alum, are useful; but sometimes the enlargement becomes so distressing, as to occasion a necessity for its immediate removal.

*Operation.*—The mode in which this is effected is as follows. The end of the uvula is seized with a pair of polypus forceps, and it is then drawn forwards, so as to be put upon the stretch, and that portion which exceeds the natural length of the part is removed by a pair of curved and probed scissors.

No bleeding of any consequence follows; and the only attention afterwards required is, to avoid any unnecessary exposure to cold air.

*Not dangerous.*—I have several times had occasion to perform this operation, and have never seen any ill effects arise from it, but often the greatest advantage produced.

## LECTURE XXVIII.

## PARACENTESIS OF THE ABDOMEN.

*Two kinds.*—DROPSY of the abdomen is of two kinds: 1st, Peritoneal, or ascites; 2d, Encysted, or ovarian.

## OF ASCITES.

*Symptoms.*—The first symptom of this disease is an unnatural sense of fulness in the abdomen after taking food, which renders it necessary to loosen the clothes; next, an increase of the lower part of the abdomen, observable at all times whilst the patient is in the sitting posture. When the patient lies down, the increase in the abdomen is general, and the enlargement is accompanied with an unusual tension; as if the abdomen were inflated. In the sitting posture, a fluctuation can be perceived in the hypogastric and lower part of the umbilical regions, by placing the fingers on one side and

tapping on the other. In the recumbent posture, the intestines appear to undulate in the cavity, having more than their usual motion. As the disease increases, the swelling extends from the lower to the upper part of the abdomen, occupying the whole cavity.

Little pain is felt, but considerable inconvenience arises from the distention, more particularly when the patient is in the recumbent position, on account of the action of the diaphragm being impeded. In proportion as the distention is greater, the fluctuation becomes distinct; and when the tension is extreme, the gentlest tap on the abdomen leads to a perception of the fluid. The secretion of urine is scanty. The enlargement of the abdomen is followed by swelling of the legs, either from the pressure of the fluid upon the veins returning the blood from the lower extremities, or from the general debility which accompanies this disease. I have known, when the omentum has been very considerably thickened, the perception of the fluctuation in the abdomen to be indistinct; and, under the same circumstances, in tapping, the quantity of fluid which has escaped has been a portion only of that contained in the cavity, part being confined behind the omentum.

*Quantity of fluid.*—The usual quantity of fluid collected is from twenty-eight to thirty pints; but when a patient has been tapped several times, the abdomen becomes much more enlarged, and the quantity is then from thirty to forty pints. In young persons the quantity is small; and the smallest quantity I have known drawn off by operation was in a medical student; it amounted only to six pints.

*Nature of the fluid.*—The nature of the fluid secreted varies but little in ascites; it is much more watery than serum, containing relatively a small proportion of albumen. It has generally a watery appearance, has a slight yellow tinge, and does not vary in its appearance and consistence, as the fluid of other species of dropsy. If inflammation succeeds the performance of the first operation, flakes of fibrin or adhesive matter are contained in the fluid next discharged.

*Cause.*—The cause of dropsy, when it is confined to the abdomen, is most frequently a disease in the liver, which acts mechanically in producing it. The pressure which the diseased organ occasions upon the vena portæ interrupts the free flow of blood through the vein, produces a congestion in the arteries and veins of the alimentary canal, and of the organs which are connected with it, and consequently leads to a greater effusion from the exhalant extremities of the arteries. Diseases of particular abdominal organs will, by the irritation they excite upon the peritoneum, occasion a greater determination to its secreting surface. Thus disease of the omentum, or of the spleen, will produce this effect.

I have known diseased mesenteric glands produce ascites; and two children, who, in my recollection, have been tapped for this disease, have recovered. Taking large quantities of spirituous

liquors tends to produce this complaint, independently of the organic change it is likely to excite in the liver; its stimulus leading to a greater determination of blood to the vena portæ than can readily circulate through this vessel, and consequently to effusion from the extremities of the arteries.

But ascites is frequently the effect of disease in the chest, of water accumulated in the cavities of the pleura, of water in the pericardium, or of some organic change in the heart, interrupting the action of the source of the circulation: the blood therefore accumulating in the right side of the heart and in the veins returning the blood to the right auricle, leads to the production of water in the abdomen, and of a general anasarctous state.

It has been a question whether dropsy arises from an increased secretion of the blood-vessels, or from an absolute diminished action of the absorbent vessels. It is generally the former I have no doubt, for reasons which I have already given, when speaking of hydrocele.

#### OF THE TREATMENT OF ASCITES.

*Medical.*—The disposition to this disease may be prevented, its progress, when it has begun, may be retarded, and large accumulations of fluid may be removed by medical treatment, and by external applications. If the disease originate in a complaint of the liver, the restoration of its secretions, and an action upon the alimentary canal by mercury, combined with other purgative remedies, become the best means of preventing effusion. If the complaint originate from local disease in some of the other viscera, as in the spleen, or omentum, the secretions must be increased in a similar manner, and blisters should be applied, and for some time continued, on the abdomen.

If water has already begun to form, the best medicines, as far as I know, are the submuriæ hydrarg: gr: jss. pulv: gambogiæ gr: ss. scillæ gr: iij. in the form of a pill, taken every night: and spir: æther: nitric: ʒss. to ʒj. oxym: hydrarg: gr. ʒ. tinct: digital: gutt. xv. with some camphor mixture, twice or three times in the day.

If water has already formed in considerable quantity, and if the powers of the constitution are sufficiently strong for its employment, the use of elaterium becomes not only justifiable but desirable, as being the most powerful and successful mode of promoting the absorption of the fluid which has been effused. But if the powers of the constitution have been much enfeebled, this remedy becomes dangerous from its severe effect. Even if the ascites be accompanied with other dropsical symptoms, the elaterium is still the remedy most to be depended upon, if the constitution will allow of its use.

*An operation necessary.*—When medicines fail of their wonted and expected influence, and the accumulation is so considerable as to impede breathing by preventing the free descent of the dia-



phragm, or when the patient finds it difficult to assume the recumbent posture, it becomes necessary to remove the accumulation by the operation of paracentesis. I have, however, known in a young person the operation performed for comparatively small collections of fluid, when the increase of the collection had ceased, and no disposition to its absorption had manifested itself. It is absolutely necessary that the fluctuation should be extremely distinct before the operation be proposed; and in cases of diseased liver, spleen, omentum, and mesentery, there is danger of the surgeon's being deceived respecting the disease.

*Result of an operation.*—With regard to the result of the operation for ascites, when the dropsy arises from disease of the liver, or from organic alteration in the chest, the relief is only temporary; but when it is the effect of constitutional disease, as fever, or arises from functional change only, under these circumstances the operation of paracentesis is frequently followed by a cure. Even in diseased liver, after the removal of the water by the use of the medicines which we have already recommended, I have known the patient ultimately recover. Considerable pressure upon the abdomen after the operation, lessens the disposition to the return of the effusion. Before the operation of paracentesis is described, I shall speak of ovarian or encysted dropsy.

#### OF OVARIAN OR ENCYSTED DROPSY.

This is a bladder of water, formed within or upon the ovarium.

*Symptoms.*—The disease is, at first, discovered as a swelling upon the brim of the pelvis, from two to three inches above Poupart's ligament, and is confined to one side of the pelvis. It is unattended with pain, and the general health remains uninjured. Under varied positions of the body it moves, in some degree, from side to side. It is a very circumscribed swelling, and has an elastic feel; it is often accompanied in its early stages with an irritation to make water, and now and then with a difficulty in its discharge.

*Progress.*—As it gradually increases it rises from the lower part of the abdomen to the upper, and occupies more and more the centre of the abdomen; at length it extends over to the opposite side from that in which it began: although it is generally largest on the side in which it commenced; at first the breathing is unaffected; but when the size of the swelling is very large, the action of the diaphragm is greatly impeded by its pressure.

*Fluctuation.*—The fluctuation in this disease is much less distinct than in ascites; but when it acquires considerable size, it becomes proportionally more and more perceptible. It depends, however, upon the thinness of the cyst. In ascites the fluid is in direct contact with the peritoneum, on the posterior surface of the abdominal parietes; but in ovarian dropsy a cyst sometimes of considerable thickness intervenes between the water and the peritoneum.

*Solid enlargement.*—The ovarium is subject to solid enlarge-

ments of very considerable bulk; and an ignorant surgeon might plunge a trocar into such a swelling, mistaking it for ovarian dropsy, which a little more attention to its want of fluctuation might have led him to discover.

At first the water which is formed in the encysted dropsy is contained, not in a single bag, but in several; the septa between which become gradually absorbed, and their number consequently diminished; and this is another reason for the fluctuation being more distinct as the disease advances. The cyst, which is, at first, of considerable density, becomes thinned by a process of absorption, leading to a more distinct perception of the fluid.

*Nature of the fluid.*—The fluid contained in an ovarian cyst varies much in appearance, it being sometimes watery; sometimes serous, containing a large quantity of albumen; sometimes mucilaginous and tenacious, so as to be ropy, but yet coagulating little under the influence of heat.

*Its colour.*—The colour also varies; sometimes being yellow like serum; sometimes it is brown and frothy; three times I have seen it yellow like pus, and containing similar globules. One case with Mr. Simpson, surgeon, in Lime Street Square, in which a pail-full of this fluid was drawn off; a second in a Miss Warner, of the Kent Road; and a third in a Mrs. R. of Chatham Place, whom I lately attended with Dr. Key.

*Hydatids.*—I have seen hydatids discharged with the fluid.

*Quantity of fluid.*—The quantity of fluid accumulated in this disease is necessarily varying, but the proportion averages from twenty-five to thirty-two pints. The greatest increase of the ovarium which I have seen is in the collection of St. Thomas's Hospital, in which the accumulation was ninety-seven pints. The least which I have removed has been sixteen pints.

*Case.*—The following is the account upon a tomb-stone near Dartford, Kent. "Here lies the body of Ann Mumford, daughter of John Mumford, Esq. of Sutton Place, in this parish. Her death was occasioned by a dropsy, for which, in the space of three years and ten months she was tapped one hundred and fifty-five times. She died the 14th of May, 1778, in the twenty-third year of her age, an example of patience, fortitude, and resignation."

This then is a proof of extent of the secretion, and of the necessity, in some cases for the repetition of the operation.

*Situation of the cyst.*—In the collection of St. Thomas's Hospital there is a preparation showing the origin of this disease; in one ovarium bags are formed within its tunica albuginea; on the other side, a cyst is produced externally to the ovarium, but pendulous from it; thus there are some cases of it internal and some external to the ovarium.

*Adhesion of the cyst.*—At first the bag does not adhere to the peritoneal lining of the abdomen; but as it becomes large, it gradually acquires such adhesion; and, upon dissection of these cases, the cyst is found to have united itself with the parietes of the

abdomen, so as to leave no space between it and the peritoneum: the intestines and omentum are situated behind it, under great accumulation.

*Burst by accident.*—The ovarian cyst sometimes bursts by accident.

*Case.*—Miss Warner, to whose case I have already alluded, was thrown out of a one-horse chaise, and burst the ovarian cyst. She soon afterwards began to make large quantities of water, and the disease disappeared; but in seven years it returned, and she was obliged to be tapped.

*Case.*—A lady with ovarian dropsy, in getting from her bed, fell against the corner of the night-chair, and ruptured the ovarian cyst, producing considerable extravasation of blood externally: her secretion of urine became abundant, and her abdomen much lessened; but the disease afterwards returned.

*Medical treatment.*—With respect to the medical treatment of ovarian dropsy, I fear a difference of opinion with many other medical men, when I say, that medicine has but little influence over this complaint.

I have seen the most gentle, as well as the most drastic medicines given to promote the absorption of the fluid, but without success; and when we consider the little vascularity of the cyst in which the water is contained, and also how little influence medicine has over common hydrocele, we shall not be inclined to expose our patients to the trial of these agents.

*Case.*—Dr. Baillie and myself attended a lady together, who could only hiss her answers to our questions; and when we asked the cause, we learned that for an ovarian dropsy, of which she afterwards died, she had undergone a course of mercury, which had occasioned a sloughing from the inside of her cheeks, without relieving her dropsy: the contraction of the cicatrices in the mouth had produced the alteration in her voice.

*Diet.*—With regard to diet, I tried in a case of dropsy the following experiment. I tapped a woman in Spitalfields, and I ordered her afterwards not to drink, but merely to suck an orange when she was thirsty: with respect to her solid food I put her under no restraint. The next time I tapped her, I allowed her to take as much fluid as nature prompted, but she filled faster with water in the former than in the latter case; the cause of the difference appeared to me to consist in the excitement of the kidneys which the fluids occasioned.

*Pressure.*—A considerable effect is produced in retarding the progress of this disease, by the patient wearing a belt, which, by its pressure, prevents the ready secretion from the exhalant extremities of the vessels into the interior of the bag. I therefore always lay my patients under the injunction to obtain and wear one.

A patient who is affected with this disease has the general health so little deranged, as not to require any change in the general mode



of living; exercise may be taken, and the same diet allowed as under ordinary circumstances.

#### OF THE OPERATION OF PARACENTESIS.

*Not to be performed early.*—This operation ought never to be performed early in the disease, but it should be deferred until the accumulation of water by its pressure upon the diaphragm influences the function of respiration.

*Reasons for delay.*—If the quantity of water in ascites be but small, much danger is to be apprehended of the trocar reaching the viscera; and in the ovarian dropsy the operation must not be performed early, because the adhesion of the ovarian cyst to the peritoneum on the fore part of the abdomen is not yet produced. The viscera, therefore, glide down between the cyst and the parietes; and I once saw, in a case of ovarian dropsy, the omentum caught by the canula, and a portion of it was brought through the opening in withdrawing the instrument, which was obliged to be returned by a probe; inflammation succeeded, and the woman died. This might have been avoided by further delay; therefore the operation should not be performed until the ovarium ceases to move easily from side to side.

A second reason for delaying the operation exists in the numerous cysts of which the tumour is first composed, which afterwards break into one; but when the operation is performed early, the escape of water is only from a single small cyst.

Before performing the operation in the encysted dropsy, as the fluctuation is much less distinct than in ascites, the greatest care is required to prevent an error.

I will here mention two circumstances, in one of which my character was exposed to considerable risk; of the other, I was informed by a medical man who was invited to witness the operation.

*Case.*—In the first case, I was desired to see a lady who I was told laboured under dropsy. When I entered the room, I saw a tall delicate female with an immense abdominal swelling, giving a distinct sense of fluctuation. I requested the physician accoucheur whom I met, to examine if the lady was not with child; he said, he thought it was unnecessary, as the fluctuation was very distinct, but that he would do so, and let me know the result in a few days. I heard no more of her for a week, and then I learned that she had been put to bed on the morning following my visit. I would not have performed the operation of paracentesis for the universe.

*Anecdote.*—The circumstances which were told me of the other case were as follow: A surgeon in a country town called upon another surgeon, and said “I am going to tap a woman to-morrow; perhaps your young gentlemen would like to be present.” As it was an operation they had never witnessed, they most readily accepted the invitation; they were shown into a room in which the

patient was already prepared to undergo the operation, she sitting at one end, with her abdomen bare. The surgeon then, taking his trocar and canula, went to some distance, and walking up to the patient with the trocar presented, he charged, as it were with a bayonet, and plunged it into the abdomen; then withdrawing the trocar with an air of triumph, it was with no small chagrin he found not a drop of water escape; but, however, still undismayed, he withdrew the canula, and again renewing his attack, he a second time introduced the trocar into the abdomen; but was equally unfortunate as before, in finding that no water followed. Waiting a few moments, he withdrew the canula, and turning round to the gentlemen, he said, "You may do her up;" by which he meant, they might apply the bandages; and he added, "This, gentlemen, is an operation which you probably never saw before, and which most likely you may never see again. This is what we call the operation of dry tapping."

Before performing this operation, the patient should be placed upon an elevated seat with the abdomen bare, a sheet is to be doubled to about a foot in breadth, and is to be passed around the body at the upper part of the abdomen, and the ends being crossed at the back, are to be held by assistants; but instead of doing this, I frequently suffer my patient to remain in the horizontal posture in bed, turning only to the side; by this plan, that faintness is prevented, which usually attends the escape of the water if the patient be in the sitting position; a pail is required to catch the water in the first instance, and a basin afterwards. The necessary instruments are a trocar and canula, or a lancet, with a canula shut at its end like a catheter, and with holes on its sides equal in diameter to the canal of the canula.

*A long trocar necessary in ovarian dropsy.*—If it be ovarian dropsy, and the cyst possesses considerable thickness, it is very desirable that the surgeon should be provided with a trocar and canula of an inch more than the usual length, as I once operated upon a patient of Dr. de Vallangin, in whom I was obliged to employ a much longer trocar and canula, being unable to reach the cavity of the cyst with an instrument of the common length.

*The proper spot for the introduction of the trocar.*—The place at which the operation is performed was changed by Mr. Cline from midway between the umbilicus and anterior superior spinous process of the ilium on the left side to one inch below the umbilicus; and his reason for this change was, that in the spread of the abdominal muscles from the pressure of the water, the epigastric artery is brought into a situation of risk of being wounded by the trocar, a circumstance which did happen to Mr. Cline. He was tapping a person in St. Thomas's Hospital, and he saw florid blood issue through the canula; the quantity gradually increased as the water flowed; and as the patient was becoming faint, he withdrew the canula and closed the wound, but the bleeding continued into the

abdomen, and the man died; upon inspection, the epigastric artery was found wounded.

Reflecting upon this circumstance, he was led to consider, that an inch below the umbilicus in the linea alba would be the safest spot for the introduction of the trocar, as no vessel would be there endangered, and it was only required that the bladder should be previously emptied. This part has been therefore of late years usually selected for the operation.

*Danger of operating at the umbilicus.*—Some have recommended the umbilicus, but the frequency of hernia renders that spot unsafe. An inch above the umbilicus has been also advised; but if there be hernia, it is equally dangerous with the umbilicus itself; and if the umbilical vein remain unclosed, there is a danger of hæmorrhage in performing the operation at that part.

Beside the danger to the epigastric artery in the operation performed at the part formerly selected, there was danger of wounding the spleen when it had become enlarged.

*Operation.*—The surgeon should place himself on a low stool by the side of the patient; the sheet is then tightly drawn by the assistant across the upper part of the abdomen, by which its lower part is rendered prominent, and the point of the trocar is placed an inch below the umbilicus, and is passed slowly and gently through the linea alba; the trocar is then withdrawn, and the canula being left in, the water is allowed to escape through it. If any interruption to the passage of the fluid by the pressure of the omentum, or of the mesentery on the end of the canula arise, a probe should be gently passed through the interior of the canula to remove the obstruction.

*Canula left in the wound.*—It has been recommended by Mr. Guy, of Chichester, and others, to leave the canula in the wound, occasionally to suffer the water to flow, and thus prevent its future accumulation.

*Sometimes produces a cure.*—A slight inflammation of the peritoneum in these cases sometimes succeeds the operation; and by the change of action thus excited in the vessels, its disposition to a future secretion is lessened, and in this way a cure is produced.

*Pressure.*—Immediately after the operation has been performed, a belt is to be tightly applied around the abdomen, to prevent the re-accumulation of water by lessening the determination of blood to the parts.

*Operation rarely successful.*—The result of the operation is generally unsuccessful in ascites, as the greater number of cases are accompanied with organic disease: the operation only acts upon the effect, and not upon the cause, and the hope of permanent advantage must be derived from medical treatment, and not from surgical operation; but the removal of the water gives additional facility to the operation of the medical means which are employed.

With respect to the ovarian dropsy, the operation is the only



means of relief; but it generally fails in producing a permanent cure.

In ascites forming after fever, and after a course of mercury, and in ascites unaccompanied by organic disease, I have known the operation succeed in producing a permanent cure. In ovarian dropsy, the instances of permanent cure from operation are exceedingly rare.

The case which I have given from the neighbourhood of Dartford shows the number of times this operation may be repeated.

In the very young and in the very old, I have known the operation succeed.

*Spontaneous cure of ovarian dropsy.*—Of a spontaneous cure of ovarian dropsy I have known several examples.

*Case.*—The wife of a veterinary surgeon had an opening at the umbilicus produced by ulceration, through which large quantities of fluid were for a length of time discharged; but the opening ultimately closed, and the disease did not return.

I have known the water discharged by the Fallopian tube; and I attended a lady in whom an ovarian cyst burst into the intestinal canal; for several years afterwards she was subject to occasional returns of the disease, but ultimately recovered.

I have known a person die from suppuration of an ovarian cyst.

*Injection of the cyst.*—The injection of an ovarian cyst has been occasionally practised with success; but it has also failed; so that its salutary influence remains in doubt.

*Removal of the cyst.*—The removal of an ovarian cyst from the abdomen might be performed in the early stages of the disease by making an opening into it, discharging its contents, and by dividing the membranous bag from its natural adhesions.

## OF PARACENTESIS OF THE THORAX.

*When required.*—This is required for accumulations of matter within the cavities of the pleuræ, or matter partially encysted in those cavities. With respect to a collection of water in the thorax, I have only once known an operation performed for it, which proved unsuccessful; the effusion of serum being only the effect of some more formidable disease.

## OF EMPYEMA.

*Causes.*—Collections of pus in the chest are the result of inflammation of the pleura, or of the pericardium; but as the latter does not admit of relief, I shall only describe the former.

*Symptoms.*—The formation of matter in the cavity of the pleura is preceded by the usual symptoms of pleuritis—viz. pain in the side, cough, hurried breathing, and imperfect expansion of the thorax; these are succeeded by rigors and greater dyspnoea, by a frequent, small, and often irregular pulse; and if the disease be con-

fixed to one side, the patient can only rest on one side. When the sides of the thorax are accurately compared, the diseased is found to be considerably larger than the sound side; the upper part of the abdomen is also much fuller on the side affected; a tense and elastic swelling may be felt there, varying with the state of respiration.

A swelling of the legs succeeds from the pressure of the accumulated fluid affecting the free circulation of the blood through the lungs, as well as altering the position of the heart.

*Spontaneous cure.*—Nature occasionally performs a cure, in the following manner: The intercostal muscles give way to the pressure of the matter, or an ulcerative process is produced, by which the pus escapes to the outer side of the ribs under the integument, which at last also ulcerates, and thus the matter becomes discharged.

*Case.*—I was sent for to Miss B—, in Chatham Place, Blackfriars, to meet her medical attendant, Mr. Murley, on account of her being under the following circumstances. She had great dyspnoea, severe cough, a quick small pulse, great emaciation, and hectic flushes, succeeded by rigors. When I examined her left side, I found a large swelling in the situation of the spleen, and another, about the size of a walnut, between the third and fourth ribs; when I pressed upon the tumour in the situation of the spleen, that between the third and fourth ribs became enlarged, so that there was evidently a fluid fluctuating between the two swellings. Thus I found that the enlargement on the left side of the abdomen was occasioned by a descent of the diaphragm from accumulation of fluid in the chest, and I did not hesitate to advise that an opening should be made into the small and circumscribed swelling between the ribs.

This being done, an immense flow of matter immediately succeeded; and when the swelling in the region of the spleen was pressed the flow increased. After a very long continued and copious discharge, this young lady recovered, and now enjoys good health.

*Case.*—I attended a young lady in Seymour Street under exactly similar circumstances, and she also recovered from the same plan of treatment. These abscesses would of themselves soon have burst, but I thought it better to save the constitution by aiding the efforts of nature.

*The pus does not always point externally.*—It frequently happens, however, that the accumulation of pus in the thorax is not accompanied by a partial swelling between the ribs, and under these circumstances the surgeon must be guided in his judgment by the symptoms I have described. In this case, it will be required to make an incision into the thorax without any well marked circumstance in the disease, to direct the situation of the opening. The surgeon will then consider in what place the wound will be the most dependent, so that the matter may readily escape.

*Operation.*—As the patient should be in the sitting position at the time of the operation, the lower part of the chest should be selected between the seventh and eighth, or eighth and ninth ribs, and the opening should be made rather posteriorly to the side of the thorax, so as to completely avoid the diaphragm. The skin being drawn up an inch, an incision is to be made through it upon the upper edge of the rib; after which, the intercostal muscles are carefully divided; and a straight canula closed at its end like a catheter, but having holes in its sides, is then passed through the pleura, and the pus is allowed to escape through it. When the matter has been thus evacuated, the canula is removed, and the skin being let go, the external and internal wounds are no longer opposite to each other, and union is more readily effected.

The reason for making the incision upon the upper edge of the rib is to avoid the intercostal artery, which is placed in a groove in its lower margin.

*Sometimes succeeds.*—This operation I have known succeed, although it is generally unsuccessful.

*Case.*—A Mr. Bryant, in the city of London, had this operation performed upon him, by Sir B. Harwood, and he ultimately recovered.

*Spurious empyema.*—Collections of pus in the thorax are sometimes partial, and then the disease is called spurious empyema.

*How produced.*—An adhesion forms between the pulmonary and costal portions of the pleura, between which also matter becomes deposited, so that the general cavity of the chest is excluded from the accumulation. This abscess ulcerates the intercostal muscles, and breaks externally, after having been the occasion of excessive pain, dyspnœa, and cough.

*Case.*—A boy, who had been a long time at sea, and who had been very much the subject of sea-scurvy, was sent to my house by his mother, on account of a large accumulation of matter upon the left side of his thorax, a part of which passed to and fro between the ribs, and projected very much if he made a deep inspiration, or coughed. Seeing him in ill health, I was fearful of making an opening, but advised him, on account of his scurvy, to take bark with sulphuric acid; under the improvement of his general health, which this treatment effected, the matter became entirely absorbed, and the boy perfectly recovered.

*Treatment.*—The treatment of spurious empyema is that of common abscess, viz. fomentations and poultices; and the opening is to be left to nature or performed by art, as the constitution is able or unable to bear the process of ulceration.



## LECTURE XXIX.

## OF HARE-LIP.

*Definition.*—THIS is a congenital fissure in the upper lip, which resembles the form of the lip of the hare.

*Many varieties.*—But the deficiency of the lip and palate is liable to great varieties.

*Simple fissure.*—1st, It is frequently a simple fissure, extending from the edge of the lip nearly to the nostril.

*Entering the nostril.*—2dly, It is sometimes more extensive, and is accompanied with greater separation, when it enters the nostril.

*Double fissure.*—3dly, The defect occasionally exists on each side, and extends into both nostrils.

*Extending through the bone.*—4thly, The fissure is not confined to the lip, but extends into the superior maxillary bone, and sometimes along the whole of the superior maxillary and palate bones, and through the velum palati.

*Double fissure extending through the bone.*—5thly, A fissure is sometimes seen opposite each defect in the lip, which extends through the maxillary and palate bones, leaving an insulated portion of each of these bones in the centre.

*Fissure only in the palate.*—6thly, The defect in the palate is in some cases a circular opening, either in the bone or in the velum palati only.

*Cause.*—As to the cause of this defect, it may be remarked that such deficiencies are more frequently observed in the median line of the body than in any other parts. The body is constituted in the greater part of two halves rather than of one whole; thus it is obvious, that the brain and nervous system of one side of the body is distinct in its functions from the other side; as for example, in cases of paralysis the nervous defect is confined often to one half of the body.

I have seen a child born with half its face; its arm and leg on one side much larger than on the other.

With regard to the organs of sense, they are each of them double. In the organs of smell and taste, although less apparently double than those of sight, hearing, or feeling, yet the function of one-half of the tongue and one-half of the nose may be lost, and the other half remain perfect.

It is at the median line that the union of the two halves of the body may be said to be produced: there it is that the nerves unite, and the blood-vessels inosculate; and from deficiency in that inosculature arise the defects which are so frequent in the central line of the body, viz. the defects in the lip and in the palate; a want of the sternum; a deficiency of the linea alba to a great extent; also

of integument, pyramidal muscles, and fore part of the bladder; the prepuce imperfectly formed at the frænum; an aperture in perineo in the male giving the appearance of the hermaphrodite.

*Exceptions.*—The exception to this rule is in the abdominal viscera, which are supplied by azygos branches from the aorta and by nerves from the ganglia.

*Contrary effects.*—On the other hand, the inosculation in some instances is unusually free, producing a closure of the anus, or of the pudendum in the female.

*Fissure in the lip easily cured.*—The congenital defect in the lip may be readily repaired by the process of adhesion, and this becomes desirable not only on account of the disgusting deformity which it produces, but also from its influence upon the nourishment of the child, its food returning by the unnatural aperture in the attempt to swallow it. The edges of the fissure in the lip are therefore pared away, the raw surfaces are preserved in complete contact, inflammation arises, adhesive matter is effused, and vessels shooting into the adhesion produce a living union of the parts.

*Proper age for an operation.*—It becomes a question of importance, at what period of life the operation should be performed, whether immediately after birth, at from three to six months of infancy, or after dentition is completed.

It is undoubtedly true that adhesion is most sure to be lasting after the period of dentition, and that this operation, therefore, scarcely ever fails when performed between two years and the adult age; on the contrary, during dentition it is attended with some danger, and sometimes the adhesion is destroyed by the violent efforts of the child; soon after birth the operation often fails, and is attended with considerable danger.

Of the proof of the danger during the period of dentition, I will mention the following case. A child of a clergyman, of more than six months of age, was sent to me from the country to be submitted to this operation. I advised that it should not be performed, but the answer was that the mother could not bear to see the child with this deformity. I operated; the child became feverish, the gums inflamed, and an incisor tooth partially made its appearance; the child was attacked with purging of the most severe kind; and, on the fifth day following the operation, it died.

*Danger soon after birth.*—The danger, however, is much greater if the operation be performed soon after birth; the nervous system is then so exceedingly irritable, that convulsions are readily produced, and the loss of a small quantity of blood occasions a fatal influence.

*Case.*—I was operating, at Great Yarmouth, upon an infant with hare-lip in the presence of Dr. Girdlestone, when he said, "Have you no fears of the child's dying?" to which I replied, "I never saw one die from this operation;" he told me that he had witnessed an operation upon a child, which was soon after seized with convulsions, and of those convulsions it died.

*Case.*—I was requested by Mr. Price, surgeon, in Tower Street, to see a child, born the preceding day with hare lip. I performed the operation, the infant lost but little blood; on the following day, when I called upon Mr. Price to accompany him to visit the child, he informed me that it was just dead, and that it had lived only twenty hours after the operation.

*Case.*—An infant was brought to my house in Broad Street with hare-lip. I operated upon it upon a Monday, and desired that it might be brought to me upon the Thursday; the mother called upon the Thursday to inform me that the child was dead.

*Case.*—During the year 1824 an infant was brought to my house, with an hare-lip of the most simple kind, and its parents were determined to have the operation performed: this was done upon a Monday morning; on the Tuesday the father of the child came to my house, and said, "Sir, my child vomited very much last night, and is this morning in a state of stupor." I directed him to give the infant some calomel, and put it in the warm bath; I called at the house in the evening, when I found that the child was dead.

Thus the danger at the infantile period is considerable, and the operation also often fails when the life of the patient is not endangered. I operated, in the presence of Mr. Cline, upon an infant, the daughter of the marshal of the King's Bench, but the lip flew open when the ligatures were removed.

*Case.*—I was requested to perform this operation upon a boy about twelve years of age, who had been operated upon in his infancy by one of the first surgeons in the city of London, yet the union had been so imperfect that a second operation was demanded.

*Practical conclusions.*—The conclusions, therefore, as far as my own experience dictates, are these: That prior to six months there is danger of a want of union, and even of the loss of life; that from six months to two years, during the period of dentition, the operation should not be performed; that, after dentition is completed, there is little risk of failure either as regards the union of the lip, or the life of the child.

*Sometimes an early operation beneficial.*—Notwithstanding I feel it my duty to mention these adverse circumstances, yet I have known the operation performed, and have performed it myself in infancy, with very complete success; and in those cases in which a fissure has existed in the upper jaw, the union of the upper lip has, by its pressure upon the bone, led to an approximation of the edges of the fissure so as to produce considerable advantage by the early operation.

*Two modes of operating.*—The operation may be performed with a simple interrupted suture or with pins. Mr. Cline, who had great experience in his profession, preferred, and in his lectures recommended, the former. The truth is, that it may be very successfully performed with either; but the interrupted suture is the most simple, and, as far as I have seen, equally effectual; it has



this great advantage, that it prevents the disturbance to the adhesion, which the lip receives in the removal of the pins.

*Operation.*—The steps of the operation are as follows: The child is to be recumbent with its head placed over a pillow, the surgeon then extends the lip from the nose, and if any adhesion to the gum prevents its being extended, such adhesion must be first divided; he next introduces a pointed and curved bistoury, at the angle of the fissure, carries it down to the red edge of the lip, and thus removes the surface from one of the sides; the removal of the opposite surface is effected from the angle of the fissure in the same way. A straight needle armed with a waxed silk is afterwards passed through each side of the lip, at the juncture of the skin with the red part, and about the eighth of an inch from the raw surface; then another needle and ligature being introduced through the integument, half way between the first suture and the angle of the fissure, the edges of the fissure are brought together by tying the portions of silk, the lower one should be secured first; and when both are tied, the ends of the silk are to be cut off above the knots, and thus the operation is concluded. There is not any necessity for applying adhesive plaster; and the more the part is exposed to the air, and the more dry it is kept, the better. The coronary artery of the lip bleeds freely in the operation, but it ought not to have a ligature applied upon it, as when the sutures are tightened the orifices of the artery become sufficiently compressed to prevent hæmorrhage.

*Removal of the sutures.*—The general rule for the removal of the sutures is on the fourth and fifth days. On the fourth day take away the upper thread, and upon the fifth day the inferior one; but although this is the general rule, yet if there be much inflammation or tendency to suppurate about the sutures, both should be removed on the fourth day.

*After-treatment.*—After the removal of the sutures, it is best not to apply any plaster unless the adhesion be incomplete at any part, and then a very narrow and long strap may be carried from cheek to cheek across the lip.

*Caution in giving food.*—In giving the child food after the operation, it should be done in such a manner as not to disturb or moisten the lip.

*Mode of using pins.*—If pins are employed, they are to be introduced at the same part of the lip as the sutures, and then the ligatures are to be twisted over their ends in the figure of an  $\infty$ . The pins should be of silver or gold with steel points, which points admit of easy removal: great care is required when taking away the silk and pins, that the adhesions may not be disturbed; this is to be done at the same period after the operation, as when sutures are used.

*Fissure in the bone.*—A fissure in the bone accompanying that in the lip, makes no difference in the mode of performing the operation, but renders its success more doubtful, from the want of sup-

port by bone which the lip would otherwise receive. In general also, in this case, the fissure in the lip extends into the nostril, and it requires great care on the part of the surgeon to produce a union of the upper part of the fissure without deformity.

#### OF THE DOUBLE HARE-LIP.

*Two fissures in the lip.*—If there be a fissure on each side extending through the lip, without any imperfection in the bone, the operation is performed in the same manner as when the fissure is confined to one side, but at successive and distant periods, so as to allow time for the complete adhesion and union of one side, before the second operation be attempted.

*Extending through the bone.*—A fissure in the bone sometimes accompanies each fissure of the lip, and then a projection of the insulated portion of bone occurs, in some instances almost to the extremity of the nose.

*Operation.*—The operation may be then performed by removing, or not removing, the projecting bone. I have successfully removed the projecting portion of bone, uniting the lip at a future period; but there was this objection to the mode of relief, that the upper lip did not project as usual from the want of that portion of the jaw and teeth, and an artificial jaw was required to form a support: it is better, therefore, to perform the operation upon each fissure of the lip, by uniting the skin upon each side, to that which remains upon the projecting bone, and to depend upon the modelling process of growth for the gradual diminution of the projection; the operation being the same as that which is necessary for the simple fissure. After the union of the lip, the diminution of the bony projection may be assisted by gentle pressure.

#### DEFICIENCY OF THE PALATE.

*Inconvenience of.*—When there is an aperture in the bony palate, the person suffers a twofold inconvenience: 1st, in a nasal pronunciation; 2dly, In the passing of the food, particularly liquid, into the nose.

*Two modes of relief.*—If the opening be confined to the bony palate, there are two modes of relief, one by the patient's wearing an artificial palate, the other by operation.

*Artificial palates.*—The most simple of the artificial palates was made for me by Mr. Weiss in the Strand, which consisted of two plates of silver connected together in the centres by an axis, so that the one could be turned upon the other by means of a key: thus when introduced, it could be easily fixed. Mr. Weiss showed me one of the same form, of elastic gum. A plate of silver, with two springs which passed through its centre, so as to expand when pushed up, would answer the same purpose. The common contrivance is a piece of silver, and a sponge connected to it by a chain

or stem; the sponge being passed into the nose through the aperture in the palate, there expands by the moisture, and fixes the silver plate against the opening, but the animal fluids in the sponge soon become putrescent, and render the breath extremely offensive.

A portion of membrane from the roof of the mouth might be partially pared off and turned over the opening, its circumference being placed in contact with the edges of the aperture so as to produce adhesion; but of this operation I have not any experience.

For a circular deficiency in the velum palati, an artificial palate of elastic gum will answer best.

*Operation for division of the soft palate.*—An operation similar to that for hare-lip, has been performed for a congenital division of the soft palate. Mr. Cruikshank tried it and failed; Mr. Roux of Paris, and Mr. Alcock of London, have since been successful.

#### CANCER LABII.

*Its commencement.*—This disease wears two different appearances in its commencement. It sometimes assumes the character of a warty excrescence, at others, it is an ulcerated fissure in the lip attended with surrounding hardness.

*At first begins in a wart.*—When it is at first a wart it is covered by an incrustation, upon removing which an elevated and ulcerated surface is exposed with surrounding hardness. A fresh incrustation forms, additional growth takes place in some parts, and ulceration in others, until at length a considerable projection is produced. When the incrustation is now removed, the surface freely bleeds, luxuriant granulations appear in some parts and deep depression in others. It extends more upon the red part of the lip than upon the surrounding skin, though ultimately the latter becomes affected. It is very little tender to the touch, so that the patient handles it with great freedom; but it is occasionally accompanied with darting pains.

*At first begins as a fissure.*—When it begins as an ulcerated fissure in the lip the surrounding part is hard, an incrustation is afterwards produced, and ultimately the disease has very much the same appearance as when it begins as a wart. It gradually ulcerates the skin towards the chin, and although beginning in a small spot at length involves the whole lip.

*Character of the sore.*—The character of the sore is that of a cancerous ulcer, its edges being everted, and its surface hard; a gland under the jaw next becomes affected between the symphysis and angle, and sometimes the glands on both sides: the gland is hard and at first not painful, then the surface assumes a livid appearance and becomes occasionally acutely painful; at length it ulcerates, discharges a bloody serum, bleeds frequently, the edges of the ulcer are everted, the ulceration becomes extensive, and the surface of the sore very irregular; several other glands in the neck become



affected, difficulty of breathing and deglutition ensue, and the patient falls a victim to the disease after a long period of suffering.

*Its cancerous characters.*—Some persons deny that the character of this sore is cancerous, but upon what principle I cannot understand, for it is unequal upon its surface, it has irregular, callous, and everted edges, it is accompanied with lancinating pains, it extends its influence to the neighbouring absorbent glands, and when a section is made of it after its removal its internal appearance is truly scirrhus.

*Rare in the upper lip.*—I have seen at least two hundred cases of this disease in the under lip, and have only witnessed one in the upper. It is a very rare disease in the female; it is a complaint of age more than of youth, occurring most frequently from fifty to seventy years.

*Supposed cause.*—A great many of the persons in whom I have seen this disease have attributed it to the custom of smoking, believing that the tobacco pipe was instrumental in its production; but I have frequently seen it in persons in whom it could not be attributed to that cause. It seems to be much more a local disease than cancer in most other parts of the body; the general health often appearing extremely good.

#### OF ITS TREATMENT.

*Escharotics.*—In the early stages of this disease the sore may be destroyed by the application of arsenic, which occasions it to slough; it might be also destroyed by the actual cautery, but in the very earliest stages it is most prudent and judicious to remove it by the knife.

*Removal by the knife.*—The operation should not however be performed if a gland under the jaw be enlarged, as the disease is then sure to return; but if the gland be not diseased, the result of the operation is much more successful than for scirrhus tubercle in the breast.

*Medicine useless.*—No local applications short of those that destroy the part, or any form of internal medicines, are found to be useful.

*Operation.*—The operation is performed in the following manner: An assistant puts a finger into each angle of the mouth, and stretches the under lip to its utmost extent; the surgeon then makes an incision on each side of the disease, so that a triangular portion of the lip is thus removed.

*Hæmorrhage.*—The coronary arteries bleed freely, but do not require to be secured; but when the inferior labial artery is formed on each side, by a large mental branch, I have found it necessary to secure that vessel at the inferior angle of the incision.

*Sutures.*—Three ligatures are then required to bring the edges of the wound together; one at the red edge of the lip, and two others at equal distances, in the remaining part of the wound.

These are to be passed through the lip by means of a straight needle, as in the operation for hare-lip. Some pressure is afterwards required, to assist in the arrest of the bleeding from the coronary arteries; the patient using a sponge for that purpose.

Two-thirds at least may be thus removed, and yet a good lip be afterwards formed. The ligatures are to be removed on the fourth and fifth days, the upper ligature being left to the fifth day.

It is a folly in this operation not to encroach upon the sound rather than upon the diseased part.

#### OF THE OPERATION FOR TIC DOULOUREUX.

*Nature of the morbid change not known.*—Of the nature of that change in the nerve which produces this disease I have no knowledge, as I have never had an opportunity of dissecting a nerve which had been affected with it.

*Appears to be an action under par.*—To me it has always appeared, that it is an action under par, rather than an inflammatory action on the nerve, and for this obvious reason, that the remedies found successful in it are those of a tonic kind: large doses of bark, the free administration of arsenic, but above all, the remedy recommended by Mr. Hutchinson of large doses of steel, are the evidences in support of this opinion.—Opium, belladonna, and other narcotics, have only a temporary influence in mitigating suffering. As local applications, I have known belladonna, and an ointment of the subacetate of lead beneficial.

*Sometimes originates in the brain.*—But this disease sometimes appears to originate in the brain itself, as I have understood was the case in my friend Dr. Pemberton, who suffered more from this disease than any individual I have ever witnessed, and in whom a portion of bone was found growing on the brain.\*

\* In the autumn of last year I was requested to attend a gentleman from Lancashire, on account of his suffering severely from a constant pain on the right side of his face, seated principally in the branches of the second and third divisions of the fifth pair of cerebral nerves. The complaint had existed for several months previously, and the pain was occasionally so acute, that his friends thought he would become insane. He took, at separate periods, mercury, arsenic, steel, bark, sulphate of quinine, opium, and various other narcotics, but without their producing much mitigation of suffering. The vinum colchici was the only medicine from which he experienced much relief, but it produced so great a derangement of the digestive organs, (although taken in conjunction with other remedies,) that it could not be administered but at intervals.

He died in the early part of February last, extremely emaciated, and completely worn out, by the almost constant and severe suffering. His mental faculties appeared perfect to within a few moments of his death, which took place on his making an effort to stand, when assisted out of his bed. On examining his head after death, I found two fungoid tumours originating from the dura mater; one situated on the right side of the sella tursica, and connected with all the branches of the fifth pair of nerves, but particularly the second and third; the other was placed over the cuneiform process of the occipital

*Division of the nerve.*—The operation of dividing the nerve for this disease is sometimes anxiously called for by the patient, on account of his agonizing sufferings; I have seen an old weather-beaten captain of a man of war cry like a child under the painful influence of this disease; and a female once said to me, after the division of the nerve, “Sir, the operating table was a bed of roses in comparison with the agony which the complaint had produced.”

*The nerves commonly divided.*—The nerves which I have divided, have been the suborbital, the frontal branches of the ophthalmic, the mental nerve, and the portio dura of the seventh pair, which is perhaps more frequently the seat of this disease than any other nerve in the body.

*Operation very simple.*—The operation is extremely simple, and is performed in the following manner upon the suborbital nerve. The ridge at the lower part of the orbit being felt, the foramen through which the nerve passes is situated from a quarter to half an inch below the centre of that ridge. The point of a curved bistory is then passed into the cheek three quarters of an inch below the ridge of the orbit, and to the outer side of the foramen, and is carried directly to the bone; then passing it upon the surface of the bone under the nerve, and little obliquely upward towards the inner canthus of the eye, the point of the knife is brought to the back of the skin at the distance of an inch from where it entered; it is then kept elevated against the back of the skin as it is withdrawn, and the nerve is thus freely divided by an opening through the skin, not above half the size of that which is made in bleeding.

Pressure with the finger is for a few minutes required, to stop the bleeding from the suborbital artery.

*Division of the frontal branches.*—The operation upon the frontal branches of the ophthalmic is performed in a similar manner; as these branches radiate more at the upper part of the orbit, it is necessary to make the division a little more extensively than in the former case.

The eyebrow is drawn up, and the point of the curved bistory introduced under it on to the ridge of the orbit, to the outer side; and being carried inwards close to the bone towards the upper part of the nose, the point is elevated to the skin, and withdrawn close to the back of it, out of the opening by which it was introduced, by which all the branches are divided.

*Division of the mental nerve.*—The operation upon the mental nerve is different to the two former; the foramen in the side of the lower jaw, through which this nerve passes, is situated in a line drawn below and between the two bicuspides; and the pain of the

bone, was of the size of half a large hen's egg, and was connected with the other tumour by a process of the same fungoid matter, which extended over the extremity of the petrous portion of the right temporal bone. The smaller tumour was about the size of a nut. The pons varolii and medulla oblongata, which were much displaced by the diseased mass, appeared softer than natural, at the part immediately over the larger tumour.—T.



disease in the nerve is felt in the under lip, and the lower part of the side of the face.

In this case, to divide the nerve, the under lip is drawn from the gum, and the point of the curved bistoury is introduced through the skin of the mouth close to the jaw, on the fore part of the foramen, and is then carried backwards close to the bone, dividing the skin of the mouth and the nerve as it passes out of the foramen, the incision being about three quarters of an inch in length; pressure is afterwards required for a short time over the foramen to stop the hæmorrhage from the artery which accompanies the nerve.

*Division of the portio dura.*—I have only once divided the portio dura of the seventh pair of nerves for this disease. I laid bare the branches of this nerve anteriorly to the parotid gland, carefully avoiding its duct, and passing a director under the nerves, divided many of the branches, paralyzing that side of the face, the mouth being drawn over to the opposite side; a few days after the operation erysipelatous inflammation succeeded, with a very high degree of fever, of which this woman died.

*Operation seldom succeeds.*—In the various operations which I have performed for this complaint, I recollect but two cases in which the operation completely succeeded.

*Affords temporary relief.*—For three or four months, the patient is relieved from suffering, but then the disease returns; and it is curious, that it is reproduced whilst the numbness of the lip consequent upon the operation still remains. I have divided the nerve a second and a third time whilst the numbness was remaining in the lip, produced by a preceding operation.

*Removal of a portion of the nerve.*—It has been said, that removing a portion of the nerve prevents the pain from returning; but a person who had submitted to this operation informed me, that he had caustic applied upon the extremities of the divided nerve, yet he consulted me for the returning disease.

With respect to the operation for the disease, it ought to be performed rather at the earnest desire of the patient than by recommendation of the surgeon.

#### AURA EPILEPTICA.

*Case.*—For this disease, I have only once had occasion to perform an operation. The case was sent to Guy's Hospital by Mr. Masters, surgeon at Watford. The man had received a severe blow on his thumb, after which he had the following symptoms, which had lasted for several months: uneasiness in the parts; pain extending up the arm in the course of the radial nerve; also to that side of the neck, accompanied, by a rotatory motion of the arm inwards; occasional loss of sense and volition, so as to occasion him to fall, but without any struggle; he remained insensible for a few minutes and then recovered, excepting that the attack left some

pain in his head. As the man had recourse ineffectually to a great variety of internal remedies and to electricity, I recommended him to submit to the division of the nerve, and making an incision upon the outer side of the radius, opposite to the insertion of the supinator radii longus, I laid bare the nerve, and putting a director under it, I removed a portion, which measured, after its removal, five eighths of an inch. The man had some slight attacks of the complaint afterwards, but on his return to Watford Mr. Masters informed me that he entirely recovered.

## LECTURE XXX.

### ON AMPUTATION.

*Less frequent than formerly.*—THE removal of constituent parts of the body becomes necessary from different causes, but such operations are much less frequently performed at present than they were thirty years ago.

*Improved treatment of compound fractures and dislocations.*—The improved treatment of compound fractures renders it rarely necessary to amputate a limb for those accidents. A compound dislocation of a large joint, a few years back, led the surgeon to condemn the limb to amputation, but it is now no longer generally believed to require it. There will, however, be cases in which an operation will be occasionally required for one of these accidents.

*Of aneurisms and diseases of joints.*—An aneurism in a limb, for which, forty years ago, amputation of the limb was frequently performed, is now, by the simple operation invented by Mr. Hunter, readily and effectually cured. The simple chronic and scrofulous enlargements of joints were formerly often deemed to require the operation of amputation, but rest, external irritation, alterative medicines, and a nutritious diet, now generally do away with the necessity of having recourse to so direful an expedient.

*Of ulcers and diseased bone.*—Extensive ulceration of a limb is now much more frequently cured than formerly. The treatment of the diseases of bones is much better understood, and the result, although tedious, is rarely unsuccessful.

*Natural separation of parts.*—In gangrene, considerable portions of the feet, or of other parts, will separate by the efforts of nature, often producing as perfect a cure as the surgeon is able to effect by operation.

*Operation sometimes necessary.*—Amputation will still be occasionally necessary for the accidents and diseases I have mentioned: for laceration of limbs from machines; for the effects produced by the bursting of fire-arms; for some cases of gun-shot wounds; for chronic and scrofulous complaints, and for malignant diseases of a

cancerous or fungoid nature; also for deformities which are either congenital or the result of organic change, and for exuberant growths, as tumours.

All that I wish to advance upon the subject is, that although the necessity for this operation still exists, that the number of amputations thirty years ago was much greater than of those of the present day.

*Much less dangerous than formerly.*—Amputation is not only much less frequent than formerly, but it is an operation of infinitely less danger. The extensive surface of wound left after the old operation, and filling the wound with charpie or flour, led to the highest degree of constitutional irritation; whilst now, the integument being brought over the wounded surface, directly produces a process of adhesion, by which the constitutional disturbance becomes lessened and the danger from the operation greatly diminished.

I shall now proceed to describe the various amputations which are required at different parts of the limbs.

The common amputating instruments are so well known, that I need not enter into any particular description of them, but I shall mention those proper to be used in each operation, when I give an account of the mode of performing it.

*Application of the tourniquet.*—Of the various tourniquets, I prefer that of Petit, which is generally employed at the Borough Hospitals. In applying this tourniquet, the pad should be placed immediately under the plate to which the screw is fixed, by which the screw is made to act more effectually on the pad. That part of the limb upon which the tourniquet is to be placed should be first surrounded by a piece of soft linen to prevent the tape, when tightened, from cutting the integument. In the thigh it should be placed a little above the middle, where the artery passes nearest to the bone; and in the arm, one-third of the length of the os humeri from its head on the inner side the biceps.

*Artery compressed without the aid of a tourniquet.*—When amputation is required at the upper part of the thigh, the termination of the external iliac artery in the femoral is to be compressed upon the edge of the pubes, by an assistant, who puts one of his thumbs over the vessel, and the other thumb upon the first, which is our usual mode. If the amputation be performed high in the arm, the assistant is either to press the axillary artery with his fingers against the head of the os humeri, or else the subclavian upon the first rib, by means of the ring of a key or a pad, passed behind the clavicle.



## OF AMPUTATION OF THE FINGERS.

In removing a portion of a finger at the second or third joints, the operation is, I think, best performed in the following manner:

*Instrument.*—The only instrument required is a common pointed scalpel.

*Operation.*—The finger being extended, the integument is cut through by a circular incision about half an inch beyond the joint, and a lateral incision is to be made on each side in the direction of the lateral ligaments, extending from over the joint to the circular cut; the portions of integument are to be raised from the flexor and extensor tendons below and above as far as the joint, making two flaps; after which the tendons and one of the lateral ligaments are to be divided, when the joint may be easily dislocated, and the separation of the part readily completed.

*Vessels.*—The vessels divided in this operation seldom require the application of a ligature, the pressure from the dressings being usually sufficient to prevent any hæmorrhage.

*Dressings.*—The flaps of the integument should be brought together, and kept so, by a narrow slip or two of adhesive plaster passed over the extremity from the dorsal to the palmar part, and these strips should be secured by a circular portion a little above the stump. The hand and fore-arm should be supported by a sling until the stump has healed.

*Another mode of operating.*—The operation of amputation may be performed at either of these joints, by making a single flap from the palmar part. In doing this the joint must be flexed, when the scalpel is carried through the integument on the dorsum of the joint, and through the joint itself, dividing the ligaments at one cut; the knife is then passed under the phalanx, which is to be amputated, and a flap of sufficient extent is separated from the palmar side.

*Not always practicable.*—This mode of amputating is more expeditious than that first described, but it is not applicable to those cases in which the finger is straight and the joint stiffened from disease, as the knife cannot be then introduced into the joint from the back part; there is also much difficulty in separating the flap without including part of the flexor tendons; and, upon the whole, the union of the divided parts is not so easily accomplished.

*Applicable to the toes.*—These operations are equally applicable to the same joints of the toes.

*Amputation of a whole finger.*—When it is necessary to remove the whole of a finger, I think it better to saw off the extremity of the metacarpal bone, rather than to open the joint. If the middle or ring finger be thus removed, less deformity results from the operation, as the remaining fingers approximate much more than when the extremity of the metacarpal bone is left; if the fore or little fingers are amputated in this manner, an ugly projection is

prevented, which would not be of any utility if suffered to remain. The wound also unites more readily, than that which is produced by the amputation through the joint.

*Instruments.*—The instruments required in performing this operation are, a common pointed scalpel, and a metacarpal saw;\* and my metacarpal saw moves upon its axis, so that it can be made to cut in any direction.

*Operation.*—The finger to be amputated being extended and separated from the others, two incisions are to be made through the integument, which meet at an angle over the dorsum of the metacarpal bone, at a short distance below the digital extremity, and terminate on each side of the first phalanx at the natural separation of the fingers; two other incisions of the same form and extent are to be made on the palmar side, which are to join the former between the fingers; the scalpel is then to be passed down on each side of the extremity of the metacarpal bone, so as to divide it completely from its lateral connexions, and the extensor and flexor tendons are also to be cut through at the point of the first incision; this being accomplished, the blade of the metacarpal saw is to be introduced between the bones, and the extremity to be removed is to be carefully sawn off.

*Dressing.*—The edges of the wound are to be brought into contact, by binding the fingers on each side of it together, when the hand and fore-arm are to be supported by a sling, as after the former operation.

*Operation of the fore or little finger.*—In amputating either the fore or little finger, only two external incisions are required, which should begin at a point below the extremity of the metacarpal bone, as in the other case, only over the centre of that side which is outermost, and extend one over the joint and the other under it in an oblique direction, so as to meet between the fingers; two flaps are then to be raised, so as to expose the extremity of the metacarpal bone; the separation of which is to be completed as before described. The edges of the wound are to be brought into contact by the application of adhesive plaster, and the arm to be supported.

*Application of ligatures to the vessels.*—If the vessels which are divided in any of these amputations afford a troublesome hæmorrhage, which cannot be readily checked by pressure, it will be proper to secure such vessels by ligatures, before the edges of the wound are finally approximated; and after any amputation, when a ligature has been applied upon an artery, one of the ends of the silk should be cut off a little beyond the knot on the vessels, as it is perfectly useless, and, if allowed to remain, only tends to increase irritation.

\* In amputating part of a metacarpal or metatarsal bone, I always use a chain saw, which I find much more convenient than the common metacarpal saw, being employed with greater facility and cutting more rapidly.—T.

*Toes to be amputated at the joints.*—When it becomes necessary to remove any of the toes, they should be amputated at the joint in preference to separating the extremity of the metatarsal bone; because it is desirable to preserve the width of the foot and support of the body, which would be diminished by the removal of part of the metatarsal bone.

*Operation nearly the same as before mentioned.*—The operation may be performed in the same way as that last described for the removal of the fingers, excepting that the incisions should not reach beyond the joint, which should be opened from the side, as in the amputations at the second and third joints.

*After-treatment.*—After any of these operations upon the toes, the patient should observe the recumbent posture, until union of the edges of the wound has been effected.

*Amputation through the metacarpus or metatarsus.*—Amputation should be performed through the metacarpal or metatarsal bones, when all the fingers or toes are so much injured as to require removal; it is much better than amputating through the carpal or tarsal bones, as, in the hand, the patient afterwards derives great advantage from the use of the carpus, which is thus preserved; and, in the foot, the insertions of the tibialis anticus, with those of the peroneus longus, and brevis being uninjured, the remaining part of the foot is much more useful, than when the metatarsal bones are entirely removed: in either case the wound unites sooner than when the articulations are exposed.

*Portions of the hand removed.*—In some cases, if the injury or disease does not extend to all the metacarpal or metatarsal bones, only such as are injured or diseased should be amputated. Thus, in the hand, the thumb with its metacarpal bone alone may be removed, or all the fingers with their metacarpal bones may be amputated, the thumb being allowed to remain; the middle and ring fingers, the ring and little fingers; or the middle, ring, and little fingers with their metacarpal bones, may, in like manner, be separated from the others.

*Of the foot.*—In the foot, the great toe and its metatarsal bone may be amputated from the others, or the others from it; or the second and third, the third and fourth, the fourth and fifth; or the third, fourth, and fifth may be removed together with their metatarsal bones.

*Case.*—In one instance I removed the middle and ring fingers with their metacarpal bones; approximating the fore and little fingers, which were not injured, by bandage. The patient recovered quickly, having perfect use of the remaining portion of the extremity.

*Case.*—I also, in another patient, amputated the thumb and the three inner fingers with their metacarpal bones, leaving only the fore finger, which was infinitely more useful than any artificial hook could have been.

*Cases.*—The metatarsal bone of the great toe I have several times



had occasion to remove; and Mr. Key has amputated the four smaller toes, with their metatarsal bones, the two outer cuneiform, and the os cuboides, successfully; leaving the os calcis, astragalus, navicular and internal cuneiform bones of the tarsus, with the metatarsal bone of the great toe and the toe itself.\*

#### OF AMPUTATION THROUGH THE CARPUS.

*Instruments.*—The only instrument required is the catling.

*Application of the tourniquet.*—Before commencing the operation, the tourniquet should be applied on the upper arm.

*Operation.*—The patient being seated in a chair, the surgeon first makes a circular incision through the integument, just over the bases of the metacarpal bones, which should include more of the integument upon the back of the hand than towards the palm; he then dissects the skin back as far as the styloid process of the radius; the integument is held back by an assistant, whilst the surgeon takes hold of the hand he is about to remove; and, feeling for the extremity of the styloid process of the radius, he passes the catling into the joint between the radius and scaphoid bone, by dividing the external lateral ligament; and he completes the amputation by carrying the knife through to the inner side of the carpal joint.

*Vessels.*—It will be necessary before dressing the stump to secure the ulna and radial arteries by ligatures.

*Dressing.*—The edges of the integument are to be brought together over the extremity, and retained in contact by means of straps of adhesive plaster,† passed from over the flexor to over the extensor muscles, and these straps are to be confined by a circular piece, after which the arm is to be supported in a sling, or upon a pillow if the patient be confined to bed.

*Amputation between the second and third row.*—I have known the hand amputated between the first and second row of the carpal bones, but I think it objectionable on account of the number of joints which are exposed.

#### OF AMPUTATION THROUGH THE FORE-ARM.

*Instruments.*—The necessary instruments are, the catling and the saw.

\* I have amputated through the metacarpal bones of the fingers, leaving only the thumb; and in another patient I removed the three inner fingers, with half of the metacarpal bone of the middle, and the whole of those of the ring and little fingers, together with the unciform and orbicular bones of the carpus. Both cases succeeded.—T.

† I prefer the plaster I have before recommended, composed of equal parts of the empl: thuris comp: and empl: saponis, to the common adhesive plaster, on account of the tendency of the latter to create irritation.

*Position.*—The patient is to be seated, and the tourniquet applied as in the former operation.\*

*Operation.*—The limb being extended, the surgeon commences the operation, by making a circular incision through the integument sufficiently high to avoid the numerous tendons at the lower part of the fore-arm; then he separates the integument from the subjacent parts, and turns them back to the extent of about an inch and a half; an assistant keeps this supported whilst the surgeon cuts through the superficial muscles by another circular incision, and allowing a short time for their retraction, he divides the deep-seated layer, and exposes the bones, from which he carefully separates the muscles and interosseous ligament, by passing the catling between and around the ulna and radius at the part on which he intends to apply the saw. The fore-arm is then held in such a position that the surgeon can easily saw through both bones at once, in doing which he should make use of the whole of the cutting edge of the instrument, and employ very little pressure, as the weight of the saw itself is almost sufficient. If the ends of the bones have any sharp points projecting from them which will sometimes happen if they have not been cleanly sawn through, these points should be carefully taken off by the bone nippers.

*Vessels.*—After this amputation four vessels will generally require to be secured; viz. the ulna, radial, and two interosseal arteries.

*Dressing.*—The wounds should be dressed as that after the amputation through the carpus, and the same treatment adopted.

*Two flaps.*—This amputation may be performed by making two flaps, one formed from the posterior, and the other from the anterior part of the fore-arm.

*Danger of amputating low down.*—I have seen two cases in which inflammation and sloughing of the tendons have followed amputation performed through the lower part of the fore-arm a little above the carpus; they both proved fatal. It is better, therefore, to avoid operating at this part, as little advantage is gained by leaving more of the bones, and the risk is greatly increased.

#### OF AMPUTATION THROUGH THE UPPER ARM.

*Instruments.*—The same instruments as used in the last operation are all required.

*Position.*—The tourniquet should be applied sufficiently high to allow of ample space for the performance of the amputation, and the patient should be seated in a low chair.

*Operation.*—An assistant extends the arm, and the surgeon first

\* If the integument of a limb be covered with hair, the patient will be saved much suffering by having that part on which the plaster will be applied, shaved, before the commencement of the operation; otherwise when the plaster is removed, these hairs are drawn out with it, rendering the separation of the dressing extremely painful.—T.

drawing up the integument with his left hand so as to put it on the stretch, divides it by a circular cut with the catling about one inch and a half above the olecranon; he then raises it from the parts beneath to the extent of about two inches, according to the size of the limb, and turning it back, he, by another circular cut, carried close to the reflected integument, divides the superficial muscles, and subsequently the deep-seated muscles down to the periosteum, and he finishes with the knife by cutting through the periosteum at the part on which he is to apply the saw. The integument and muscles being carefully held back, the saw is applied and the bone divided, when the amputation is completed.

*Vessels.*—Three arteries will generally require the application of ligatures, viz. the brachial, profunda, and ramus anastomoticus.

*Dressing.*—The edges of the integument are to be brought together by the application of adhesive plaster, and the patient being placed in bed on his back, the stump is to be supported on a pillow, so as to be rather higher than the shoulder.

*Application of a roller.*—If the skin be loose or the muscles flabby, a roller should be put around the limb to give support to these parts, before the patient be placed in bed.

It may be necessary in some cases to amputate higher up than I have mentioned, but the steps of the operation will be otherwise the same.

#### OF AMPUTATION AT THE SHOULDER JOINT.

*Instruments.*—The only instrument required is a catling.

*Subclavian artery compressed.*—The subclavian artery is to be compressed upon the first rib, from above the clavicle, by an assistant. The ring of a common key, covered with some soft linen, is a convenient instrument for this purpose.

The patient should be seated on a low chair, and the arm, to be removed, should be elevated a little from the sides by an assistant.

*Two modes of operating.*—The operation may be performed by making a single flap or two flaps; I prefer the former, but in some cases, on account of a disease extending so as to prevent the formation of a single flap, the latter mode should be adopted.

*Operation with a single flap.*—In making the single flap, the surgeon raises the deltoid muscle with the fingers and thumb of his left hand, and introducing the catling through the integument, and under the muscle near to its insertion, he cuts upwards close to os humeri as far as the under part of the acromion process; the integument and larger part of the deltoid muscle are thus raised, so as completely to expose the outer part of the shoulder joint; the arm being then drawn downwards, the catling is passed into the joint at the anterior part, so as to divide the tendon of the biceps muscle, and afterwards is carried round the head of the bone to cut through the capsular ligament: the separation of the limb may be completed either by passing the knife over the head of the bone, and cutting downwards to the axilla, or by placing the knife in the



axilla and dividing upwards to the joint; in either case the amputation should be finished by one stroke of the catling.

*Vessels.*—The axillary artery is to be immediately secured by a ligature, and small branches from the circumflex arteries may be required to be tied.

*Operation with two flaps.*—When two flaps are required, the first incision extends from just below the point of the acromion downwards, and backwards into the axilla, being curved a little forwards and passing below the insertion of the latissimus dorsi muscle; the back flap is then raised, dividing at the same time part of the deltoid, and the insertion of the latissimus dorsi; the anterior incision through the integument is begun from the same point as the posterior, but carried downwards and forwards below the insertion of the pectoralis major, into the axilla, so as to meet the termination of the first incision; this flap is then raised in part, to expose the capsular ligament, which is to be divided, together with the tendon of the biceps muscle as in the former operation; after which, the head of the bone being dislocated, and the flaps being held back, the catling is passed behind the bone, and the amputation is completed by dividing the remaining portion of the interior flap, together with the axillary vessels, nerves, &c. The artery is to be secured as before mentioned.

*Dressing.*—After either mode of amputating, the straps of adhesive plaster, employed to keep the edges of the wound in contact, are best applied from before to behind, and should be of sufficient length to keep a firm hold.

*Operation successful.*—In every instance in which I have performed the amputation through this joint, and every case in which I have seen it done, the recovery of the patient has been speedy and perfect.

#### OF AMPUTATION BETWEEN THE TARSUS AND METATARSUS.

*Instruments.*—As I think it best to saw off that part of the internal cuneiform bone, which supports the metatarsal bone of the great toe, a saw will be required, as well as a strong catling.

*Position.*—A tourniquet should be applied upon the thigh, and the patient should be placed upon a low table in the recumbent posture.

*Operation.*—The leg and foot being extended, and fixed by an assistant, the surgeon divides the integument across the dorsum of the foot, commencing at the base of the metatarsal bone of the great toe, and terminating the incision about half an inch beyond that of the little toe; he then makes a lateral incision on each side, so as to enable him easily to dissect up the flap of integument as far as the joints of the four smaller metatarsal bones, and that part of the internal cuneiform which is on a level with these articulations; the extensor tendons being next divided, the four small metatarsal bones are bent downwards, and their ligamentous connexions with the tarsal bones cut through with the point of the catling, after which, the internal cuneiform bone is sawn through

even with the other tarsal bones: the amputation is completed by passing the catling between the separated bones, dividing the flexor tendons, &c. and forming a flap of about equal size to the superior from the integument on the sole of the foot.

*Vessels.*—The anterior tibial on the dorsum pedis, and the two plantar arteries of the sole, will most probably require the application of ligatures.

*Dressing.*—The integument is to be brought over the extremities of the bones, and the edges of the wound kept in contact by straps of adhesive plaster, passed from the sole to the dorsum; the patient is to be placed in bed, and the foot supported by a pillow, until union has taken place.

*A single flap may be made.*—Sometimes a single flap may be made from the dorsum, or sole of the foot, but it does not unite so readily as the double flap.

#### OF AMPUTATION THROUGH THE TARSUS.

*Instrument.*—A catling only is necessary in performing this operation.

*Position.*—The tourniquet must be applied, and the patient placed as in the former case.

In this operation, the navicular bone is to be separated from the astragalus, and the os cudoïdes from the calcis.

*Operation.*—The surgeon, having felt for the projecting point of the navicular bone on the inner side of the foot, cuts through the integument about three quarters of an inch beyond it, straight across the dorsum of the foot, and having made two small lateral incisions, he dissects back the upper flap, and divides the extensor tendons over the articulations, which he then opens, first, by cutting through the lateral ligaments on the inner side, uniting the navicular bone to the astragalus, then the ligament on the dorsum connecting the same bones, and afterwards the ligaments between the os cuboides and calcis, above and externally; the knife being then passed down between the articulations, the inferior ligaments with the flexor tendons and muscles in the sole are divided, and the operation concluded by making an inferior flap of the integument equal to the superior.

*Vessels.*—The same arteries require to be secured as after the former operation, and the dressing and after position of the patient are to be similar.

*Not a successful operation.*—From a comparative result of this operation, with that of sawing through the tarsal bones, I am certain the latter produces less irritation and danger than the former.

#### OF AMPUTATION OF THE LEG BELOW KNEE.

*Various modes of operating.*—This operation may be performed with a circular incision, and with a single or double flap. I prefer the first, but cases may present themselves, in which it may be proper to adopt either of the other modes.

*Instruments.*—In performing the operation with a circular inci-

sion, a small amputating knife is usually employed in completing the first step; but a catling is necessary to divide the soft parts between the tibia and fibula; and this, if rather larger than usual, does equally well in the commencement. A saw is also required.

*Position.*—The patient is to be placed in a recumbent position, on a table, and the tourniquet is to be applied upon the thigh.

*Operation.*—One assistant holds the leg, and supports it at a convenient height; another assistant grasps the leg just below the knee and keeps the integument stretched by drawing it towards the thigh, when the surgeon commences his first incision over the anterior part of the tibia, about six inches below the patella, and carrying the knife round the limb, he at one sweep divides the integument, terminating the incision at the point from which he commenced; he next separates the integument from the subjacent parts to the extent of two inches or more, and turns it up, in which position it is retained by an assistant, whilst the surgeon cuts through the superficial muscles, close to the reflected integument; and having allowed these to retract, he divides the deep-seated with the interosseous ligament and the periostium by passing the catling between and around the bones. The knee being then turned inwards, the saw is applied first upon the tibia, and when this bone has been in part divided, the saw is made to act upon the fibula also, so that the amputation is finished by sawing through the remaining portion of the tibia and the fibula together.

#### OF AMPUTATION WITH A SINGLE FLAP BELOW KNEE.

*May be performed in two places.*—This operation may be performed as low down as is possible without interfering with the Tendo Achillis, when the patient is desirous of afterwards wearing an artificial leg made of cork, instead of the common wooden one; otherwise the bone should be sawn off at the same point, as when the circular incision is made.

*Instruments.*—A long catling and a saw will be required.

*Operation.*—The position of the patient, and of the limb, being as when the circular operation is performed, the surgeon feels for the posterior edges of the tibia and fibula, over one of which he places the thumb, and over the other the fore-finger of his left hand, the palm resting upon the anterior part of the limb; the extremity of the catling is then introduced immediately below one of these points, and steadily thrust through the calf of the leg, until it protrudes just below the other point, when the blade is carried downwards, so as to form a flap of sufficient size, from the muscles and integument posteriorly; the next step of the operation is, to divide the integument anteriorly, by making an incision commencing at the place at which the catling was thrust in, passing over the fore part of the leg, and terminating at the spot from which the catling was pushed out: the amputation is completed after this, in the same manner as in the common operation.

*Operation with a double flap.*—A double flap is sometimes made from the outer and inner sides of the limb, when the surgeon com-



mences the operation by an incision on the outer part of the leg, reaching from the anterior edge of the tibia to the back of the calf: and having a semicircular form with the convexity toward the malleolus externus, he then dissects back the flap of integument, and afterwards makes a corresponding flap on the inner side, commencing and terminating as the former. The flaps being held back by an assistant, the operation is finished in the usual manner.

*Vessels.*—After either of these amputations three vessels will have to be secured, viz. the anterior tibial, the posterior tibial, and sometimes the peroneal.

*Dressing.*—It is best in either case to place the straps of adhesive plaster, when dressing the stump, from side to side, rather than from above to below, as, by this, pressure is avoided upon the anterior edge of the tibia, which might otherwise produce much irritation and ulceration.

*After-position.*—The patient should be placed upon his back in bed, and the thigh being flexed towards the abdomen, a pillow should be put under the ham, and the stump be allowed to hang over it. The limb should be inclined a little to the outer side.

*Objections to a single flap.*—The objections to the operation with a single flap are, that the wound does not unite so readily as that made by a circular incision; and if after-hæmorrhage occurs, which renders it necessary to open the stump, there is a greater difficulty in securing the bleeding vessels; and in debilitated persons, the disturbance of the adhesions is likely to produce a slough of the flap. The anterior edge of the tibia being also more exposed is more likely to exfoliate, and the subsequent contraction of the flap makes the union tedious.

*Sometimes necessary.*—When, however, the integument upon the anterior part of the leg has been destroyed, the formation of a single flap from the posterior part becomes absolutely necessary.

#### OF AMPUTATION ABOVE THE KNEE.

*Instruments.*—A large amputating knife and a saw will be required.

*Position.*—The patient is to be placed upon a table on his back, and the tourniquet is to be applied high enough upon the thigh to allow of ample room for the retraction of the integument and muscles.

*Operation.*—One assistant supports the leg, and another draws up the integument on the upper part of the thigh. The surgeon first cuts through the integument surrounding the limb about an inch and a half above the patella, to avoid the bursa of the rectus, beginning on the superior part over the rectus, and passing the knife round with one sweep to terminate at the same point; he then dissects up the integument for about three inches, and this is kept reflected by an assistant whilst the superficial muscles are divided by another circular cut close to it; the assistant holding the integument then draws it upwards to assist the retraction of these muscles, after which the deep-seated muscles and the periosteum are

cut through so as to expose the bone, which is lastly to be sawn through.

*Vessels.*—The following vessels will require the application of ligatures: the femoral branches of the profunda, and sometimes the sciatic.

*Dressing.*—The integument is to be brought over the end of the stump from side to side, and confined by straps of adhesive plaster, after which the patient is to be placed upon his back in bed, and a pillow should be put under the upper part of the thigh so as to elevate the stump.

#### OF AMPUTATION AT THE HIP JOINT.

*Femoral artery to be secured first.*—In this amputation it is decidedly the safest plan to secure the femoral artery by a ligature at Poupart's ligament, as the first step of the operation.

*Mode of doing it.*—An incision is begun two inches above the middle of Poupart's ligament and is extended two inches below it: the femoral artery is to be laid bare, and the ligature introduced at the centre of the incision is to be tied upon the denuded vessel opposite Poupart's ligament, and above the arteria profunda.

*Operation.*—A long catling is then used to make the inner incision through the integument and muscles. This incision is to be begun at the lower part of that which was made to expose the artery, and it is to be carried from thence on the inner side of the thigh obliquely downwards, and is then continued on the outer side of the thigh below the trochanter major to the point at which it began; in this way a larger portion of integument is left to form a covering to the stump than would be produced by a circular incision without obliquity.

In the same line a second incision is to be made to divide the muscles, but the edge of the knife is to be inclined obliquely upwards towards the joint, and the integument and muscles being drawn back, those of the latter which are inserted into the trochanter major should be cut through.

A third incision is to be made to divide the psoas and iliacus internus muscles and the forepart of the capsular ligament, when the knee being pushed backwards and outwards the head of the bone is dislocated as far as the ligamentum teres will permit; this being divided, the head of the bone turns completely out of the acetabulum forwards.

A last incision is made by passing the knife over the head of the bone, and behind it, so as to cut through the remaining muscles, &c.

*Not the quickest mode.*—I am ready to acknowledge that this is not the quickest mode of removing the limb; but securing the artery in the first instance prevents a patient, who is much reduced, from eventually sinking in consequence of the loss of a very considerable quantity of blood.

*Vessels.*—When the limb has been removed, branches of the obturator, ischiatic, and gluteal arteries will require to be secured.

The sides of the wound are to be brought together, and, if they easily meet, by adhesive plaster only; but if there be any difficulty in their coalescence, it is best to employ a suture.

The same after-treatment is necessary as after other amputations.

*Preferable to saw through the trochanter.*—I am, however, of opinion, that in every case in which the amputation can be performed by sawing through the thigh bone below the attachment of the capsular ligament, that it should be done in preference to opening the joint and removing the head of the bone from its socket.

*Case.*—I have only once amputated at the hip-joint, and the patient recovered, but only after excessive suppuration from the acetabulum, sloughing of portions of the cartilage, and continuance of suffering and fever, exposing him to great risk, which would have been greatly lessened had it been possible from the state of the bone to have sawn through the os femoris at the trochanter.

*Removal of the dressings.*—The removal of the dressing for the first time after an amputation must depend in a great measure upon the feelings of the patient as regards the stump, and from the appearance of the discharge.

*On the sixth or seventh day.*—If the patient does not experience any unusual pain in the stump, the plasters should not be disturbed for six or seven days, by which time the adhesion of the edges of the wound will have become sufficiently firm to prevent any risk from the removing the dressings, provided it be done carefully.

*Part cut away.*—Should the patient experience shooting pain in the stump, and have other symptoms of suppurative inflammation, some portion of the plaster should be cut away from the lower part of the wound, in order to allow of the escape of any matter that may form, and a light poultice should be applied.

*Plasters snipped.*—When a tightness is felt at any part of the stump from the pressure of the plaster, the surgeon should snip some of the straps on the side, which will generally relieve the pressure.

*Mode of removing the plaster.*—When the stump is dressed, the straps of plaster should be taken off one by one, and care is required not to disturb the ligatures; if union of the wound be not complete, some fresh straps should be applied as the old ones are removed, by which mode separation of the edges of the wound may be greatly prevented.

*Sometimes to be removed early.*—Should the first dressings become much loosened, or the stump be excessively painful, the plasters must be removed earlier than I have mentioned.

*Separation of ligatures.*—If the ligatures do not come away by the fourteenth day after the operation, the surgeon should gently draw each thread when he dresses the wound, in order to expedite their separation.



## APPENDIX.

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ON THE

### AREOLAR, OR MAMMILLARY TUMOUR.

BY SIR ASTLEY COOPER, BART.

*Age at which it occurs.*—At the age of seven years, and from that period until puberty, children are not unfrequently subject to the swelling behind the nipple, or mammillæ of the breast. This swelling occupies a circle of an inch or more, involving the posterior part of the nipple.

*Symptoms.*—The child, feeling uneasiness in the part, is led to examine it with attention, and then finds a swelling, which is generally tender to the touch, and is sometimes, though not commonly, acutely sensitive. The skin over it is undiscoloured; it moves freely upon the pectoral muscle; but the nipple moves with it. I have seen it frequently, both in boys and girls; but I think more frequently in the male than in the female. It generally affects only one breast; but sometimes, though rarely, it exists in both. It does not appear to accompany a scrofulous disposition, but is found in irritable young persons. The age at which it has most frequently presented itself to my observation, has been from eight to twelve years.

Within this period, then, a surgeon will be sometimes called upon to remedy a hard circular sensitive tumour behind the nipple and areola. Its cause I shall presently proceed to explain, when existing at this period of life.

*Not productive of serious mischief.*—I have never seen it productive of any serious disease. Sometimes, however, it endures for several months, if attention be not paid to the means for its removal.

*Treatment.*—The best mode of treatment consists in the application of the emplastrum ammoniaci cum hydrargyro, and in giving small doses either of the hydrargyrus cum cretâ, with rhubarb, or of the oxymurias hydrargyri, with bark or sarsaparilla; under the influence of which remedies, it generally becomes gradually absorbed in the space of from two to three months. It sometimes yields to evaporating lotions.

*Disease in the adult.*—The same part which is affected posterior to the nipple, in earlier periods of life, becomes the seat of more serious disease in after age. For the structure, which I am presently to describe, is liable, particularly in the male, to be affected with the two malignant diseases to which the body is subject, namely to the schirrous affection, or to the fungous.

## OF THE SCHIRRUS OF THE MAMMILLA.

*Symptoms.*—This disease begins with a circular swelling at the root of the nipple. It is at first free from pain, but is excessively hard, and is somewhat irregular upon its surface. It gradually increases in size, and during its growth a shooting, darting, and occasionally a lancinating pain strikes through the swelling, and to the shoulder, in the course of the mammary nerves.

*Ulceration.*—A slight ulceration next supervenes upon the surface of the nipple, which is succeeded by a yellowish brown incrustation. When the first incrustation is separated, it is succeeded by another, and a deeper ulceration ensues, by which process the nipple of the breast is gradually removed, and the schirrous substance is exposed. Whilst the ulceration is proceeding in the centre, the schirrus increases in circumference, until it occupies a considerable circle round the nipple, and as the bulk of the disease augments, the pain with which it is accompanied is likewise aggravated; yet the diseased part is only in a slight degree tender to the touch, and the patient is often seen to handle it in an unfeeling manner.

*Bleeding.*—The discharge from it, which had previously formed an incrustation, now increases and becomes fluid, and the sore frequently bleeds.

*Glands affected.*—The glands in the axilla become enlarged and hardened, after a long continuance of the complaint. The patient's lungs become diseased, and water is effused into the cavity of the chest. I have seen several males, and one or two females die of this complaint; and I have given a view of the appearance which the swelling assumes on dissection.

*Removal necessary.*—As this disease is beyond the control of medicine, for none that I have ever known recommended, or seen employed, seems to have the least influence in preventing its destructive effect, its removal must necessarily be effected either by the knife or by the application of arsenic. The former mode is vastly preferable to the latter; it is upon the whole less painful in the execution, and it is of more certain efficacy in completely removing the disease. Arsenic, on the contrary, often but partially removes the complaint: and the irritation which it excites extends the disease to the neighbouring absorbent glands. The absorption of the mineral, also, sometimes produces sefious effects upon the constitution. When the disease is clearly and completely removed by the knife, the edges of the wound are brought together, and they readily unite by adhesion.

*Treatment if an operation cannot be performed.*—If the disease has been neglected, if extensive ulceration has ensued, and the complaint has proceeded beyond the relief which is to be derived from surgical operation, the applications which I have seen most advantageous in tranquillizing the sore, and improving its appearance, have been chalk and opium, in the proportion of an ounce of the former to a drachm of the latter; oxide of zinc and opium in the same proportions; or oxide of bismuth with opium. These means, however, only retard the progress of the disease, rendering the descent to the grave a little more easy and a little less rapid, but they do not prevent the fatal termination of the complaint.

## OF THE FUNGOUS TUMOUR OF THE MAMMILLA.

*Symptoms.*—Of the fungous tumour of this part I have seen three different instances, each of which existed in the male, and each was removed.

The tumours began behind the nipple, which adhered firmly to their surfaces. They were globular, and did not possess the hardness of true schirrus, but felt at first more like simple chronic tumours, and grew less firm as they increased. They were but slightly tender when pressed, and entirely free from pain. They neither of them had ulcerated. After they had existed for several months they began to increase rapidly, and this circumstance excited

alarm in the minds of the patients, so as to lead them to make application for surgical assistance. The medicines which I advised, and the applications which I proposed, appearing to have no influence in preventing the progress of the disease, I recommended extirpation. Two of the patients recovered without any returning disease; the third, after a few months, sunk under what was believed to be hepatic disorder.

*More spongy than scirrhus.*—I have given a plate of the appearance of one of these tumours; it is much more spongy than the true scirrhus. The vessels which it possesses are more numerous, and their diameters larger, more especially of the veins. It not only adheres to the nipple, but it proceeds from its basis. The vessels which supply it are of considerable size, and require to be carefully secured to prevent after-hæmorrhage. In neither of the cases had it contracted adhesion to the pectoral muscle; and there was therefore no difficulty in detaching it from the surrounding parts.

#### ON THE SEAT OF THESE DISEASES.

Having thus described the diseases which are placed at the basis of the nipple, I shall now proceed to point out the structure in which these complaints begin; and which the plates connected with the work will very clearly explain.

*Discharge of fluid from the nipple of the infant.*—A child born at the full period of gestation, whether it be male or female, is found to have, issuing from its nipple, a fluid of milky appearance, which, when alcohol is poured upon it, deposes a solid, which has the appearance of coagulated albumen. This fluid the nurses are in the habit of pressing out; as they pretend that it is liable to excite inflammation if suffered to remain. Whether this be the case or not, or whether the inflammation which sometimes ensues be the result of pressure and friction which the nurses employ, I am not able to state; but inflammation does sometimes ensue, and require fomentation for its relief.

*Structure of the part.*—Thirty-two years ago I first learned there was such a discharge from the nipple; and was led to examine whence it proceeded; when, upon making a section through the middle of the nipple towards the ribs, I found a circular glandular structure, larger than a large pea, and situated directly behind the nipple. It is of a red colour, from its extreme vascularity. It contains ducts which open at the nipple; and from these may be pressed, first a milky fluid, afterwards a sebaceous matter. The nipple over it is situated in a depression, and appears red and granular in many subjects. The artery which supplies the gland is derived from the axillary; and the branches derived from, and distributed to the gland are numerous. Veins return the blood in the course of the arteries; and filaments of nerves from the axillary plexus are distributed to it.

*Mode of exhibiting it.*—All that is necessary to do, in order to observe this structure, is to make an incision through the centre of the nipple. In the fœtal state, between the seventh and the ninth month, this glandular substance is found, but of smaller size. At the end of the first year, it is still large and continues so during the second and the third year; and thenceforward it seems to lessen in both male and female until the seventh and eighth year. It is most conspicuous in fat subjects, as it is kept extended from the nipple by the adipose substance.

*Evolution of the nipple.*—About the eighth year it begins to increase, but it varies as to time in different persons; and as it grows towards the age of puberty the nipple becomes evolved from it. In the female, at the age of puberty two tumescences will appear; the one a small sphere directly surrounding the nipple; which then rather sinks into this little swelling; and the other a larger sphere which is composed of the mammary gland, or gland of the breast. Thus there is a mamillary and a mammary growth; a mamillary producing the nipple, which is gradually envolved as the breast increases; a



mammary which is composed of the lacteal gland, the lactiferous tubes of which proceed through the mamillary process. In the male the mamillary gland forms the nipple; but instead of tubes proceeding through it, ligamentous cords are seen radiating from the point of the nipple through the mamillary substance. These ligamentous cords terminate in a compact cellular texture at the basis of the nipple; and the cells thus produced become loaded with adeps, so as to sustain and preserve the projection of the nipple.

If, then, a section be made of the nipple of the male in the adult subject through its centre, radiated ligamentous cords are found in its substance, and a strong network containing fat at its basis. In the plate this will be well seen in a section of the nipple of Coombs, lately executed for murder, whom I selected on account of his age, and because he was a healthy person. I made a section through the nipple, and then threw it into warm water to melt out the fat which it contained, and thus unloaded the strong network of cellular tissue at its basis.

The evolution of the nipple is as follows:

In both male and female infants a gland exists which is the nidus of the future nipple, over which the skin is puckered into a small projection. This glandular substance lies concealed under the skin until near the age of puberty, and then it gradually evolves, and becomes everted into the nipple of the adult. In the male, the tubes through which the milk of the infant passes become ligamentous cords in the nipple of the adult, and in the female the similar tubes become the lactiferous ducts of the nipple. Thus it is that the nidus of the adult nipple is protected until the age of puberty.

*Disease seated in this structure.*—It is this structure, then, of the male and female nipple, prior to the age of puberty, at the time when evolution of the nipple is commencing,—which produces the swelling to which young people are subject, from the age of eight years to the period of puberty; for, when the action is greater than the evolution requires, a hard inflammatory swelling is produced.

It is in this structure that in future years the malignant areola or mamillary tumour forms. Here the schirrous tubercle commences, which destroys the nipple, and ultimately extinguishes the life of the patient. It is in this structure that the fungous swelling which the plate exhibits is formed; and both of these are from the male. The female is less subject to the disease, because the mamillary substance is principally absorbed, and lactiferous tubes are formed in its stead.

## EXPLANATION OF THE PLATES.

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### PLATE I.

- Fig. 1. A view of the nipple as it appears in the male fœtus.  
Fig. 2. A section of the mammillary gland in the male child at birth.  
Fig. 3. A posterior view of the mammillary gland in the male child at birth.  
Fig. 4. A section of the mammillary gland of a male two years of age.

### PLATE II.

- Fig. 5. Section of the mammillary gland of a female twelve years of age.  
Fig. 6. Section of the mammillary gland of a female four years of age.  
Fig. 7. Section of the mammillary gland of a female at birth, with the vessels which proceed from the axilla.  
Fig. 8. Section of the mammillary gland of a male five years of age.  
Fig. 9. Section of the mammillary structure of Coombs (lately executed at Maidstone.)

The ligamentous substance seen which remains after the cessation of the glandular structure. Clusters of cells in the cellular tissue, from which the fat has been separated by putting the section into warm water.

### PLATE III.

Three different views of a mammillary tumour, taken from a person of the name of Left, aged 40 years, on May 29th, 1824.

It commenced sixteen years before this period from a slight blow, but did not become larger than a pea during eight years. Four months before its removal it became occasionally painful, and increased considerably.

It was seated in the right breast behind the nipple and areola.

From the kind of pain he described to exist in it, I advised its removal. Upon cutting into it after the operation, I found it to have more of the fungoid than the scirrhus character, and was glad that I had removed it, as it appeared to me to be of a malignant nature.

I did not see the patient afterwards.

Fig. 1. *a.* Integument. *b.* The nipple. *c.* The tumour.

Fig. 2. *a.* Integument. *b.* The tumour.

Fig. 3. *a.* The tumour cut open.

On the 17th of November, 1824, I removed a tumour from the same situation for a hair-dresser in the city. Its size was rather less than the former.

#### PLATE IV.

The disease represented in this plate begins in persons advanced in years, by a swelling behind the areola or nipple, and the latter becomes enlarged or drawn in.

When it ulcerates, the sore has a cancerous aspect; but it is rather more disposed to slough than the cancer of the female. The edge of the ulcer is ragged, the surrounding parts are hard, and the pain is of the lancinating kind, as in true cancer. The best case in illustration is to be found in the Medical Journal, published by Mr. Elliott, now a chemist in Fenchurch Street.

The disease extends to the absorbent glands in the axilla.

Fig. 4. An anterior view of the nipple of the male, in which the mamillary substance is affected with cancer; the nipple is enlarged, and the surrounding parts ulcerated. I removed it from a man between sixty and seventy years of age.

Fig. 5. An internal view of the same disease, a section having been made through it to show the scirrhus deposit. It has very much the character of cancer in the female breast.  
*a.* The surrounding adeps. *b.* The scirrhus deposit.



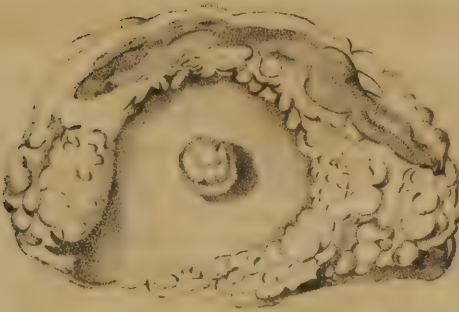
N 1



N 2



N 3

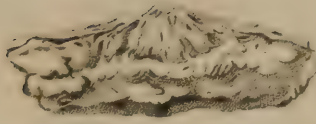


N 4





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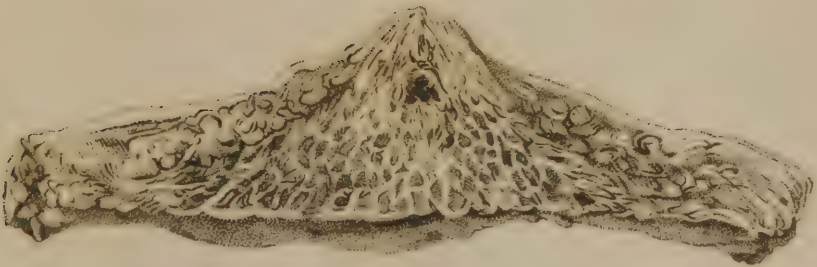
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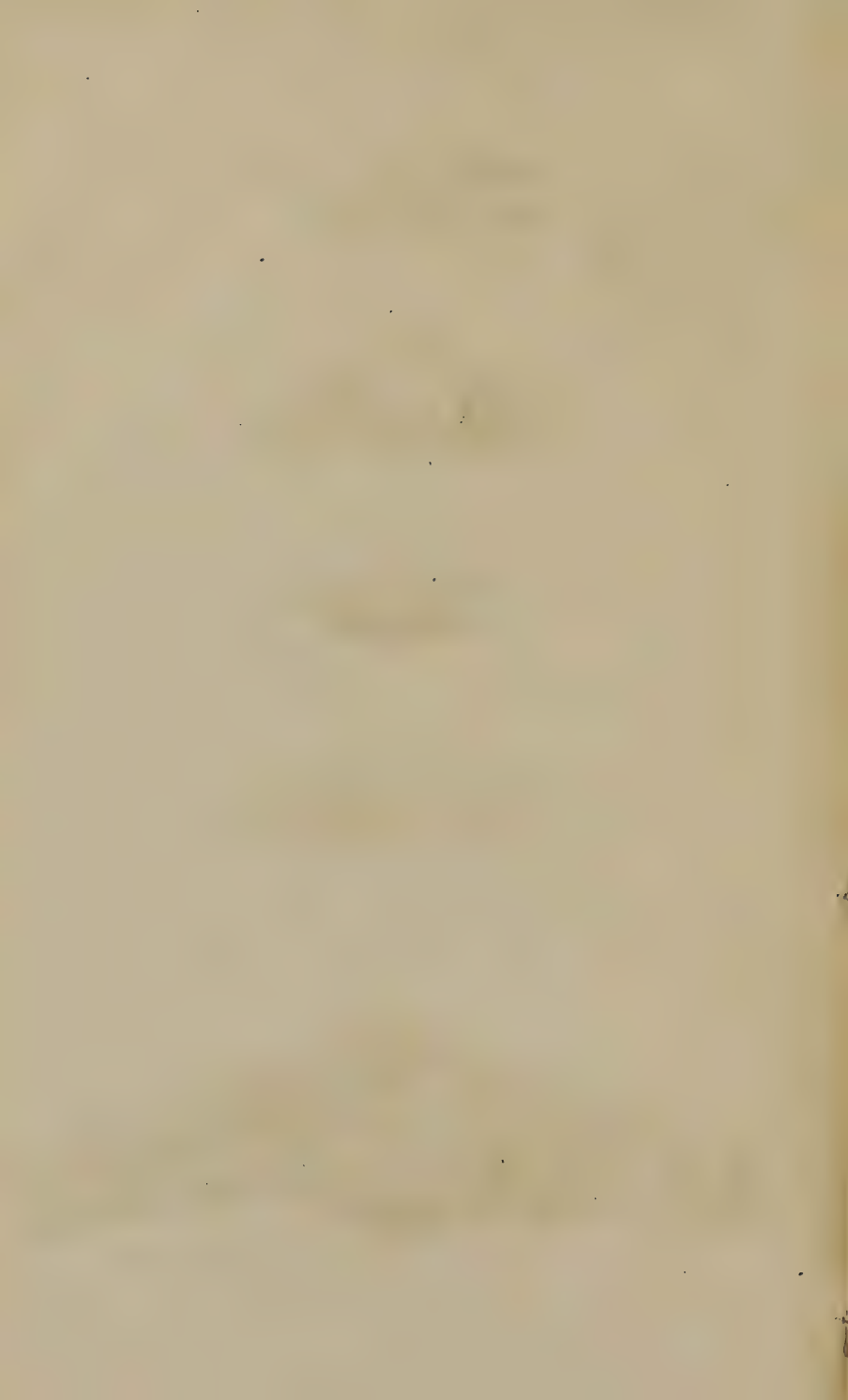
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*Fig 1*



*Fig 2*



*Fig 3*







Fig. 4

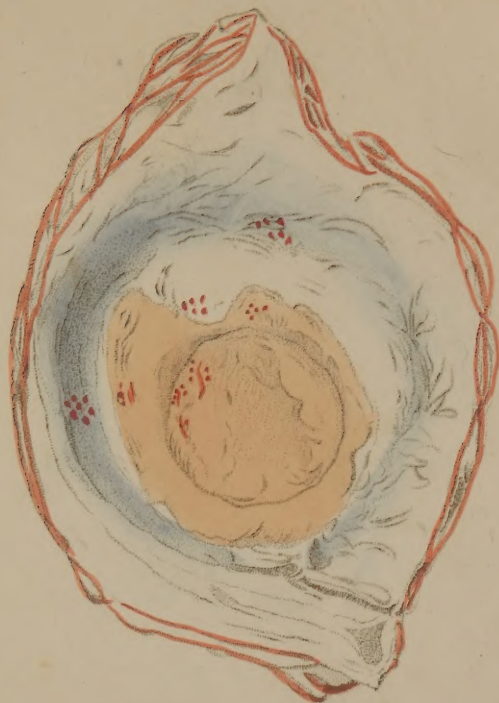


Fig. 5









